

S
639.9
F2Q
APR-JUN 1948

MONTANA

Fish and Game Commission

Wildlife Restoration Division

QUARTERLY REPORT



April - June - 1948

Pittman-Robertson Federal Aid Projects

Montana State Library



3 0864 1006 2651 7

NOTES

FOR AND CASE DISCUSSION

WILLIAM H. HENNINGSEN

No. 1186

LIBRARY OF
GLACIER NATIONAL PARK
BELTON, MONTANA

Date rec.

DISCARD

3-49

MONTANA

FISH AND GAME DEPARTMENT

WILDLIFE RESTORATION DIVISION

No. 1186
LIBRARY OF
GLACIER NATIONAL PARK
BELLEVUE, MONTANA
Date Rec'd 2-3-49

639.9
Mo

APRIL - JUNE - 1948



Digitized by the Internet Archive
in 2012 with funding from
Montana State Library

<http://archive.org/details/quarterlyreport01mont>

INDEX

	<u>Page</u>
Division Personnel.	1
Introduction.	3
1-R Surveys and Investigations - Western Montana	
Kootenai Unit:	
Lincoln County Game Survey, 1947-1948.	4
Swan-Blackfoot Unit:	
Big Blackfoot-Clearwater Winter Survey, 1947-1948.	56
Garnet Range-Rock Creek Big Game Survey, 1947-1948	89
Absaroka Unit:	
Northern Yellowstone Elk Herd Cooperative Count.	117
Big Belt-Boulder Unit:	
Jim Ball Basin Elk Range Investigations.	121
Clark Fork Unit:	
Inspection of the Cherry Creek Game Preserve	125
Deerlodge Unit:	
Special Elk Season Investigation.	127
Wise River-Big Hole Moose Report	133
Flathead-Sun River Unit:	
Early Spring Inspection of South Fork of Flathead.	140
Aerial Reconnaissance of Mountain Goats and Elk.	160
Sun River Guides and Packers Association Meeting	165
Gallatin Unit:	
Land Lease Investigation (B. A. Black Property).	169
Madison-Ruby Unit:	
Willow Creek Antelope Investigation.	173
Antelope Census in Beaverhead and Madison Counties	176
Ruby River Deer Investigations.	185
Blacktail Creek Elk Investigation	193
Big Game Winter Survey, 1947-1948.	203
1-R Surveys and Investigations - Eastern Montana	
Beartooth Unit:	
Aerial Inspection of Beartooth Mountains	250

(Continued)

INDEX (Continued)

	<u>Page</u>
Blaine Unit:	
Antelope Damage Inspection.	253
Carter Unit:	
Carter County Antelope Study, Summer 1947	256
Antelope Trapping Operations Inspection	308
Choteau Unit:	
Highwood Mountains Inspection.	310
Missouri Breaks Unit:	
Aerial Inspection of Fort Peck Game Range	314
Garfield County Rancher-Sportsmen Meeting	321
Notes on Bighorn Sheep Pasture Inspection	324
Yellowstone Unit:	
Rancher Interviews on Sweetgrass County Antelope Season	326
1-R Surveys and Investigations - Game Birds	
State-wide:	
Survival Studies on Game Farm Raised Pheasants.	329
Experimental Plantings of Safflower and Multiflora Rose	344
1-R Surveys and Investigations - Statistics	
State-wide:	
Cumulative Record of Big Game Data.	346
6-D Posting Game Preserves - Final Report.	369
17-D-3 Game Range Development Through Salt Distribution.	379
21-R-2 Magpie Control Investigation.	389
Magpie Trapping in the Twin Bridges and Sheridan Areas.	393
22-D Mountain Sheep Pasture (Missouri Breaks Unit)-Final Report.	396
24-M Water Facilities	
Wildlife Habitat Development Aerial Inspection.	405
26-M Aerial Salt Distribution - Bitterroot Unit.	409
Letter of transmittal and signatures.	413

WILDLIFE RESTORATION DIVISION PERSONNEL

Robert F. Cooney.Director
W. Ken Thompson.Assistant Director
Faye M. Couey.Big Game Biologist
Wm. R. Bergeson.Game Bird Biologist
Hector J. LaCasse.Draftsman-Photographer
Dorothy Nopper.Secretary-Bookkeeper
Midge Mongrain.Claims Clerk
Margaret Dixon.Junior Bookkeeper
Ann Johnson.Stenographer
Don Brown.Assistant Big Game Biologist
Merle J. Rognrud.Assistant Big Game Biologist
Robert J. Greene.Assistant Game Bird Biologist
Edward Blaskovich.Assistant Draftsman-Photographer
Stewart Brandborg.(Summer Season) Fieldman
Lawrence Brown.Fieldman
Robert Casebeer.Range Fieldman
Kenneth Davis.Field Assistant
Wynn Freeman.Waterfowl Biologist
J. E. Gaab.Unit Manager
George Goers.(Summer Season) Field Assistant
C. H. Harkness.Junior Foreman
Fred L. Hartkorn.Fieldman
Richard L. Hodder.Range Fieldman
Wm. F. Koch.Junior Foreman

Frank Lancaster. Senior Foreman
 Dave Lane. (Summer Season) Field Assistant
 Franklin D. Lawrence. Assistant Shop Foreman
 Edward E. Ludtke. Field Assistant
 William Maloit. (Summer Season) Field Assistant
 James McLucas. Field Assistant
 S. A. Mongrain. Warehouse Foreman
 Bruce Neal. Manager
 Robert Neal. Assistant Fieldman
 Jack Owens. Senior Foreman
 Kenneth Riersgard. Fieldman
 Gerald Salinas. Field Assistant
 Jack E. Schmautz. Unit Biologist
 Rex C. Smart. Shop Foreman
 George Sturtz. Junior Field Assistant
 K. V. Watt. (Summer Season) Student Assistant
 Donald Williams. Field Assistant
 Wesley Woodgerd. Student Assistant
 Ade Zajanc. Assistant Unit Biologist
 Howard Campbell. State Trapper

INTRODUCTION

This quarterly report covers the period from April 1st to June 30th, 1948. It is composed primarily of completed reports on the winter big game investigations which have extended through the fall, winter and early spring periods.

Also included are final reports on Aerial Salting, 17-D-3; Posting 6-D; and the Mountain Sheep Pasture, 22-D; for the fiscal year 1948.

Miscellaneous partially completed projects, and minor investigations are inserted to make complete the activity records received to date in the office.

This quarterly is not intended to be composed of polished scientific treatises, but rather working records of projects conducted by this division. In some cases where material is of sufficient value, data will be edited and submitted for technical publication.

July 15, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

KOOTENAI UNIT

LINCOLN COUNTY GAME STUDY

1947-1948

Submitted by:
Ade Zajanc, Fieldman
Wildlife Restoration Division

June 1, 1948

TABLE OF CONTENTS

	<u>Page</u>
Description of County.	7
Purpose of Study.	7
Coverage.	7
Wolf Creek-Fisher Area	9
Description	9
Coverage.	10
Tabulation of strip counts:	
Upper Fisher	13
Lower Fisher	14
Browse species in use.	15
Tobacco Valley-Fortine Area.	20
Description.	20
Coverage.	21
Tabulation of strip counts:	
Deer.	23
Moose.	24
Browse species in use.	27
Gateway-Jennings Area.	28
Description.	28
Coverage.	29
Tabulation of strip counts:	
Mule deer.	31
White-tail deer.	32
Bighorn sheep.	33
Browse species in use.	34
Libby Area.	38
Description	38
Coverage.	38
Tabulation of strip counts.	40
Browse species in use.	41
White-tail deer sex ratios	44
Mule deer sex ratios.	45
Trends as shown by past game studies	46
Hunter harvest.	46
Natural losses	47
Recommendations for management:	
Utilization.	48
Management of habitat:	
Salting plans.	50
Reseeding.	51
Cooperation with private land-owners	51
Tabulations:	
Weather information.	52
Abundance of game.	53
White-tail deer seen on strip.	54
Mule deer seen on strip.	55

(Continued)

TABLE OF CONTENTS - (Continued)

	<u>Page</u>
Maps:	
Wolf Creek-Fisher winter range.	16
Strip trips and salt plans.	17
Tobacco Valley-Fortine winter range	25
Strip trips and salt plans.	26
Gateway-Jennings winter range	35
Strip trips and salt plans.	36
Bighorn Sheep range.	37
Libby Area winter range	42
Strip trips and salt plans.	43

LINCOLN COUNTY BIG GAME STUDY

1947-1948

The study unit comprises the whole area of Lincoln County in the northwest corner of the state of Montana. The County is primarily drained by the Kootenai River and its tributaries, the Fisher, Yaak and Tobacco Rivers. Elevations vary from an average of 2,500 feet along the Kootenai to around 8,000 feet in the Cabinet Range. The dominant feature of the unit is the forest which consists of 2,304,000 acres or 96% of the area. Eleven thousand acres or .6% are barren and brush, and 76,000 acres or 3.45 are cultivated, pasture, grass and townsite. Lumbering contributes 70% of the annual income and the railroad and mines contribute the balance. The vegetative cover and other environmental factors of almost the entire area are suited for the production of deer and the principal industry which is lumbering should have no detrimental influence.

PURPOSE

The purpose of the survey was to assemble information on the following subjects:

1. Present condition of the various ranges.
2. Extent of the winter range.
3. Distribution of game animals.
4. Present population of game animals.
5. Sex ratios.
6. Percent of young or probable annual increase.

COVERAGE

The survey was conducted by Ade Zajanc and John Hennessy beginning October 5, 1947 with headquarters in Libby. Field headquarters were the various Ranger Stations throughout the Kootenai National Forest. Methods of travel were by automobile and on foot. During the period from October 5, 1947 to March 15, 1948, 4,247 miles were traveled by auto and 728 miles were covered on foot. Snow depth this winter did not necessitate the use of skis or snowshoes.

Tentative plans were to spend a week in each unit of the County during the fall and early winter to become familiar with the ranges, then re-cover the areas during the heaviest concentration periods and return for a spring check on game conditions. The fall reconnaissance was completed and a thorough winter coverage of the Wolf Creek-Fisher Drainage, Tobacco Valley-Fortine Area, Gateway-Jennings and Libby areas was made, leaving the Troy and Yaak areas uncovered. The findings for the units surveyed are found in the following separate reports.

SUB-UNIT NO. 1

WOLF CREEK-FISHER RIVER DRAINAGE

This unit is composed of the areas drained by Wolf Creek and the Fisher River. The elevation runs from 2,500 feet in the valleys to 6,000 feet, with the exception of the portion included in the Cabinet Range, which is slightly over 7,000 feet. Nearly the entire area is considered Forest land, with the exception of a few widely scattered farms, and is used as summer range by deer.

Thirty-four thousand acres can be classified as winter range and are composed of four different types:

1. Open yellow pine on the south and west exposures.
2. Stream bottom type.
3. Open grassy hillsides.
4. Douglas fir, lodgepole, larch jungles on the north and east slopes which are not used very extensively.

This winter range is in a depleted condition at the present time due to over-utilization in prior years. The winters of 1941-42 and 1946-47 were very severe and caused unusual concentrations. Also, during the war years populations were probably higher than at present due to lighter hunting pressures. It has been established that the existence of the Wolf Creek Game Preserve had an adverse effect on this winter range. In many cases, not only the key species such as serviceberry, chokecherry, mountain maple and Ceanothus, but emergency species such as buffaloberry have been browsed to the point of killing.

The foregoing seems to apply especially to the slopes, while the browse found in the stream bottom land is in good condition and it is

believed that this winter the deer are deriving most of their subsistence from these areas, due to the fact that the light snowfall allows them free access to the stream bottoms.

It should be emphasized that the damage has been done in previous years and that the present mild winter with its accompanying lack of heavy concentrations should tend to alleviate the present condition. Another pertinent fact is that logging operations are being carried on in parts of this range and are scheduled to continue for a number of years. This should have a beneficial effect on the range by stimulating the growth of browse species through soil disturbance and other factors in conjunction with removal of timber. These logging operations should provide a rich field for the investigation and observation of the effects of logging on a deer range.

COVERAGE

Because of the mild winter and lack of concentrations a slight deviation was made in the regular strip counting procedure. The first step was to determine the uppermost limits of the winter range. Then strips were made usually contouring the hillside through the center of the winter range established. Instead of using a pre-determined width, the strip width was determined by the visibility; that is, by the average distance at which deer could be seen. These distances were established by estimation and occasionally checked by actual measurement. Thus, by calculating the number of acres under observation and tabulating the number of deer seen the deer per acre figure was derived.

In computing the winter range it was decided to divide the area into two parts. One portion includes that part of the Fisher Drainage

east of Highway #2 and the Wolf Creek Drainage. The other part consists of the winter range adjacent to Highway #2 extending to the Flathead County line. This was done because it was apparent that concentrations were heavier in the lower Fisher than in the other parts of the range.

The Wapiti Mountain area consisting of approximately 1,280 acres was also computed separately because recent logging operations there had attracted an unusual number of deer, forming a more or less isolated concentration area.

In the lower Fisher-Wolf Creek section, 2,020 acres were covered by strips and 482 deer were seen, which amounts to .24 deer per acre. The winter range is estimated to be roughly 16,000 acres. This figure was obtained by marking the known winter range boundaries on a map and calculating the acreage within these boundaries. This gives a total population of 3,840 white-tail deer for the lower Fisher area.

Using the same method for the other portion of the Fisher Range, we find 16,800 acres of winter range. Coverages here show 78 deer on 544 acres or .14 deer per acre, giving a population of 2,352 white-tail deer.

The Wapiti Mountain area of 1,280 acres shows 72 deer for 109 acres or .66 deer per acre, a total of 818 white-tail deer for the area.

Adding these figures up we find a total of 7,010 white-tail deer for the entire area.

Since only a negligible number of mule deer were seen, no computations were made regarding them. However, there seem to be a few places where mule deer are found in appreciable numbers, principally the East Fisher Drainage, Kenelty Mountain area, and the higher elevations of the

lower Fisher-Wolf Creek area. It is felt that there are approximately 200 mule deer in the East Fisher Drainage and an additional 400 in the rest of the area. There is a possibility that many of the mule deer migrate into the Dunn and Canyon Creek Drainages and on down toward the Kootenai River to winter.

During the survey only one band of 29 elk was seen, although information gathered from reliable sources and signs seen indicate the existence of several other bands in the locality. There are probably not more than 150 in the area.

Moose in this district are rare enough to be considered somewhat of a curiosity. Only one moose and two tracks were seen during the survey. Consequently all other information was gathered from farmers and local residents. From these contacts it is estimated that there are about 25 moose in the unit. Moose range is not shown on the accompanying map, but would include any of the stream bottom type found in the Fisher area.

TABULATION OF STRIP COUNTS FOR
THE UPPER FISHER AREA

Trip	Strip Width: In Yards	Miles Covered	Acres Covered	White-tail: Deer	Mule: Deer	Elk	Coyo- tes
Raven R. S. Area	200	5	364	46	4		1
Elk Hill	100	1.5	54	5			
Slimmer Creek	100	3.5	126	27			
Total		10	544	78	4		1
Wapiti Mountain	150	2	109	72			
Copper Creek					45		
Brulee Creek					36		

TABULATION OF STRIP COUNTS FOR
THE LOWER FISHER AREA

Trip	Strip Width In Yards	Miles Covered	Acres Covered	White-tail Deer	Mule Deer	Elk	Coyo- tes
Alder to Cody Creek	200	3	218	78	1		
Cody Cr. to chute	200	2	145	14	3		
Chute to Ariana Cr.	200	3.6	261	157	9	29	2
Ariana to 6 Mi. Post	200	4.4	319	46			3
River Bottom	100	3	164	39			
Guard Sta. to River	100	1.5	55	24		1*	
Guard Sta. to Snell C.	200	5.8	421	64			1
Smoke Creek	150	5	273	24			
Squaw Creek	150	3	164	36		3 ^o	
Total		31.3	2020	482	13		6

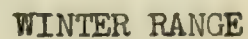
*Moose

^oTracks

PRINCIPAL BROWSE SPECIES IN USE

1. *Amelanchier alnifolia*. Serviceberry
2. *Prunus demissa*. Chokecherry
3. *Acer glabrum*. Mountain maple
4. *Ceanothus velutinus*. Snow bush
5. *Arctostaphylos uva-ursi*. Kinnikinnick
6. *Odostemon aquifolium*. Oregon grape
7. *Cornus stolonifera*. Dog wood
8. *Philadelphus lewisii* Mock orange
9. *Alnus tenuifolia*. Alder
10. *Betula fontinalis*. Birch
11. *Salix* sp. Willow
12. *Symphoricarpos albus* Snowberry
13. *Lepargyrea canadensis*. Buffaloberry
14. *Ribes* sp. Gooseberry
15. *Rosa* sp. Rose

LIBBY

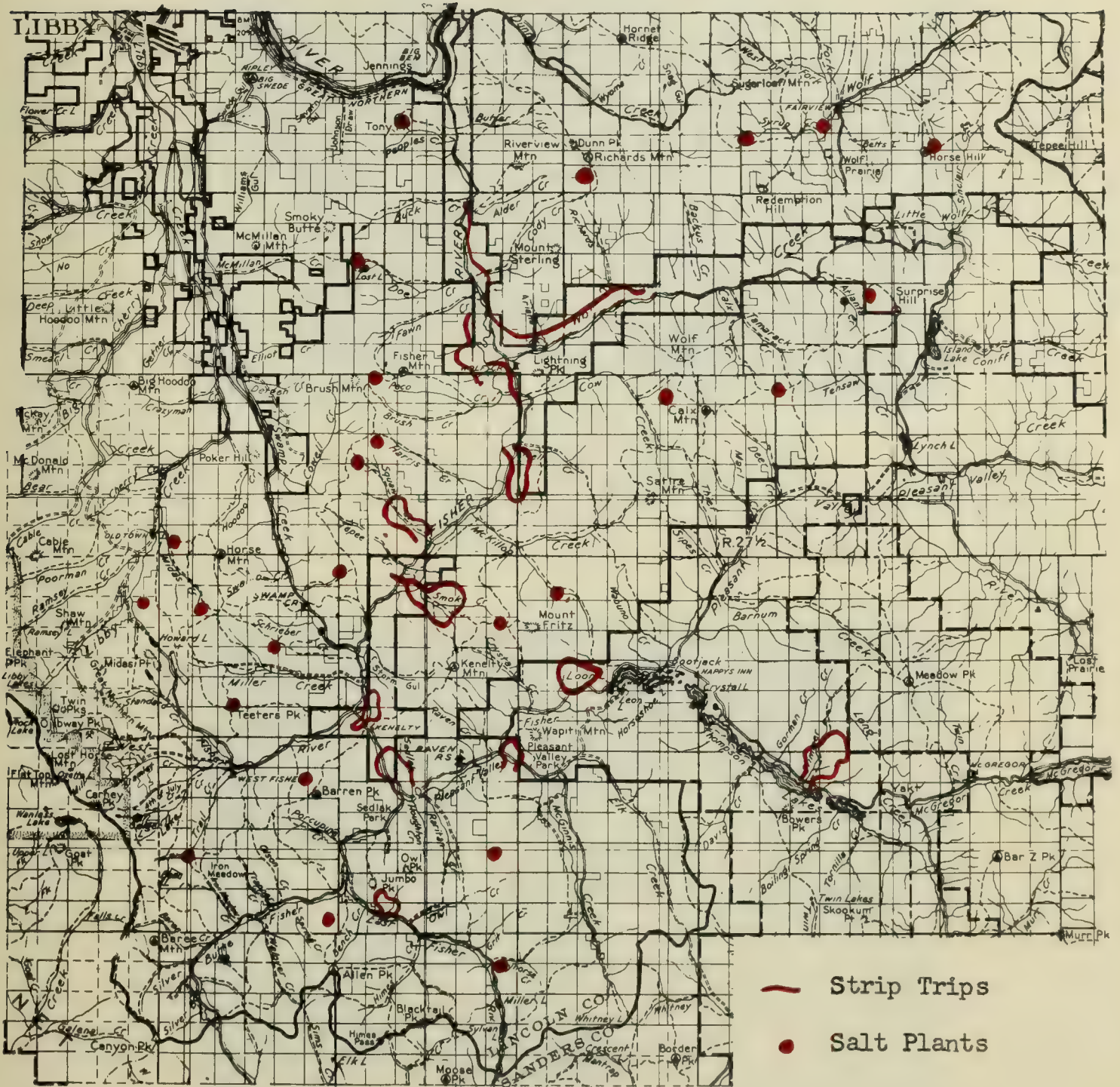


Elk Herds ---

White-tail Deer —

Mule Deer

FISHER-WOLF CREEK AREA







Buffalo Berry on Snell Creek showing
over-browsing in previous years.



Old "deer line" on Douglas Fir reproduction on
Snell Creek in Wolf Creek-Fisher Area,



Typical open grassy hillside type of winter
range on Cody Creek in Wolf Creek-Fisher
Area. Deer are White-tail.



Old cropping of Ceanothus on Snell Creek
in Wolf Creek-Fisher Area.

SUB-UNIT NO. 2

TOBACCO VALLEY-FORTINE AREA

This area is composed of the Tobacco River Drainage, the Pinkham Creek Drainage and a small area drained by Sunday Creek. It differs somewhat from other parts of Lincoln County in that the topography consists of low, rolling hills in the valley areas, bordered by rugged mountains on the northeast and high timbered mountains in the Pinkham country. The Tobacco Valley is quite extensively farmed and the parts not under cultivation are mostly logged-off and covered with coniferous reproduction. The whole district can be classed as summer deer range.

Thirty-five thousand, two hundred acres are estimated to be white-tail winter range and 32,640 acres for mule deer. Elevations run from three to five thousand feet. The ranges overlap to the extent that 20,480 acres are common to both species. For all practical purposes there are 14,720 acres exclusively white-tail range and 12,160 acres exclusively mule deer. Types of range found are:

1. Stream bottom type.
2. Open grassy knolls.
3. Conifer reproduction (larch, fir, lodgepole).

The winter range shows much evidence of over-utilization in past years, the key species, such as, chokecherry, serviceberry, mountain maple and Ceanothus being badly over-browsed. Buffaloberry is very plentiful and is not being utilized to any great extent this year, but has been in the past. Very little conifer damage has been noted this year. Haystack damage has been minimized by proper fencing, but primary farm damage is to the first crop of alfalfa and can be attributed mainly to mule deer,

according to reports.

COVERAGE

Census methods used were the same as for the Wolf Creek-Fisher area. Two thousand, six hundred and thirty acres were covered and 163 or .062 white-tail deer per acre were found. Mule deer numbered 207 or .079 deer per acre. Using 35,200 acres of white-tail range, we find a population of 2,182 white-tail deer. Thirty-two thousand, six hundred and forty acres gives a population of 2,578 mule deer. In the exclusive white-tail range there are 16.12 acres per deer, and in the exclusive mule deer range there are 12.6 acres per deer. In the over-lapping range there are 7.09 acres per deer. This amounts to approximately 90 deer per square mile in the over-lapping area, which includes most of the places where farm damage occurs. From this standpoint, this is perhaps the most critical section in Lincoln County and should be watched with a great deal of interest.

Hunters have reported seeing elk during hunting season on Edna and Sutton Creeks, but the only evidence of them on this survey was found on DeRozier Creek, where a band of about a dozen is believed to range. It is possible that these animals migrated down from Canada. Elk are relatively insignificant in this unit which is perhaps a good thing, considering the number of farms in the Tobacco Valley.

The Pinkham, Sutton, Edna and Sunday Creek Drainages are considered to be the primary moose range in the unit. On the trips throughout the moose range, 2,213 acres were covered and one moose was seen. It was estimated that there are 160,000 acres of moose range; therefore, using these figures, we get an estimated population of 72 moose in this area.

Due to the mild winter, the moose were found to range over the ridges as well as the bottom-land and apparently travel extensively. Very few deer were found throughout the moose range. Browse being utilized by moose consisted mainly of dog wood, willow, maple and cottonwood. There was no evidence of over-use. It is believed that moose are frequently seen during the summertime, due to the accessibility of their habitat through Forest Service and logging roads and also their tendency to travel, thus creating the impression that there are more moose than actually exist.

It is the opinion among interested observers of the Pinkham moose herd that it is gradually spreading out. This is substantiated by the fact that moose have been seen throughout the County with increasing frequency in the past few years. It may be that the Pinkham herd is a nucleus which produces moose for surrounding areas. If this be the case, the herd should probably be left undisturbed for the present.

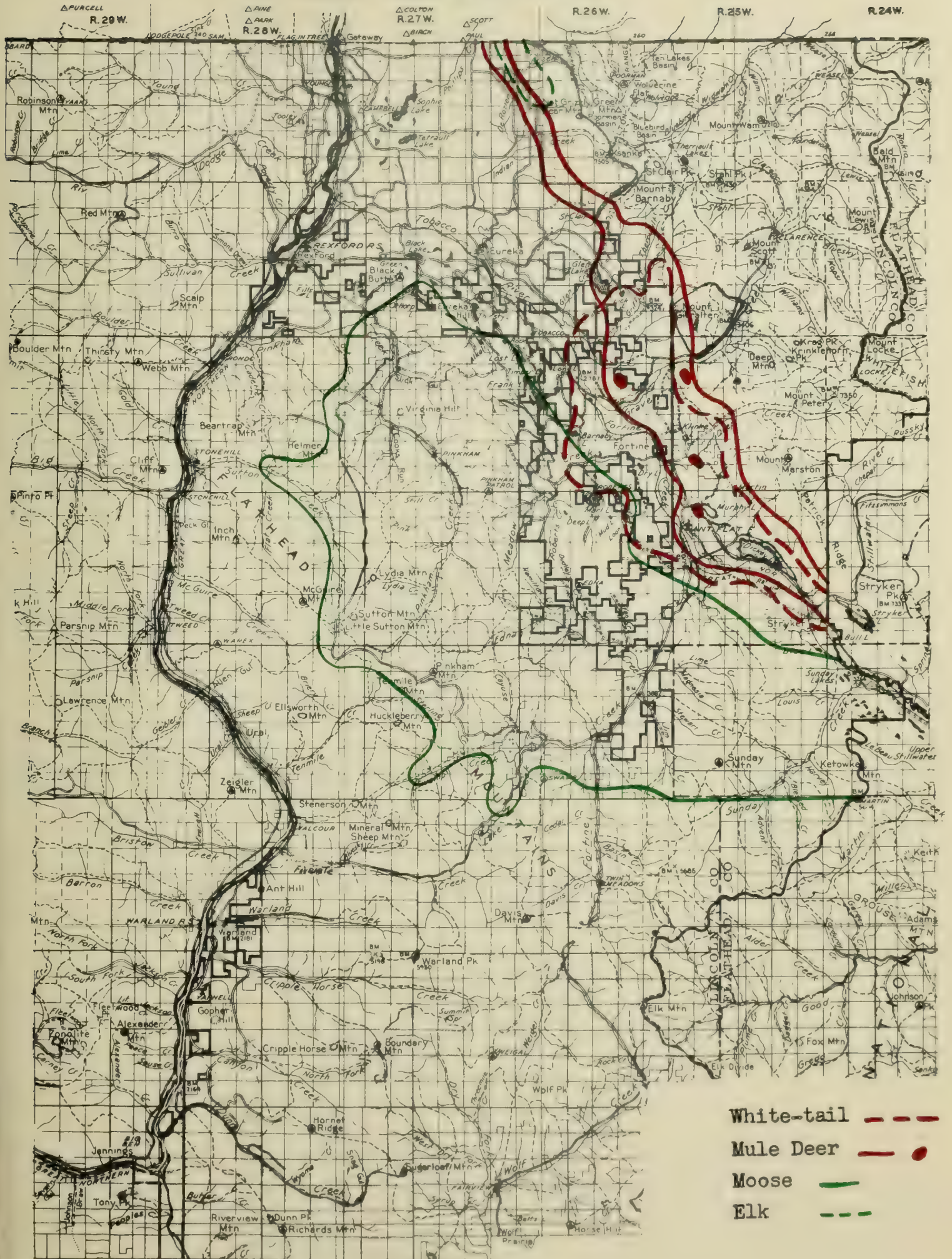
TABULATION OF STRIP COUNTS IN THE
TOBACCO-FORTINE AREA

Trip	Strip Width In Yards	Miles Covered	Acres Covered	White-tail Deer	Mule Deer
Grave Cr. (Pres. Border)	150	1.25	68	17	3
Grave Cr. (3 Mi. Post)	200	3.5	254		37
Grave Cr. (3 Mi. Post)	150	4.	218	10	2
Grave Cr. (Sec. 10 & 11)	300	4.	436	33	66
Grave Cr. (Sec. 3 & 4)	200	3.	218	12	3
Baldy Mountain	150	3.	164	5	13
Weydemeyer's	300	2.	218	9	70
Glen Lake Road	150	2.	109	3	
DeRoziert Creek	150	3.	164		7
Meadow Creek	200	4.	290	33	
Trego-Martin Lake	150	6.	327	32	6
Trego-Dudley Slough	150	3.	164	9	
Total		38.75	2630	163	207

TABULATION OF COVERAGES IN MOOSE RANGE

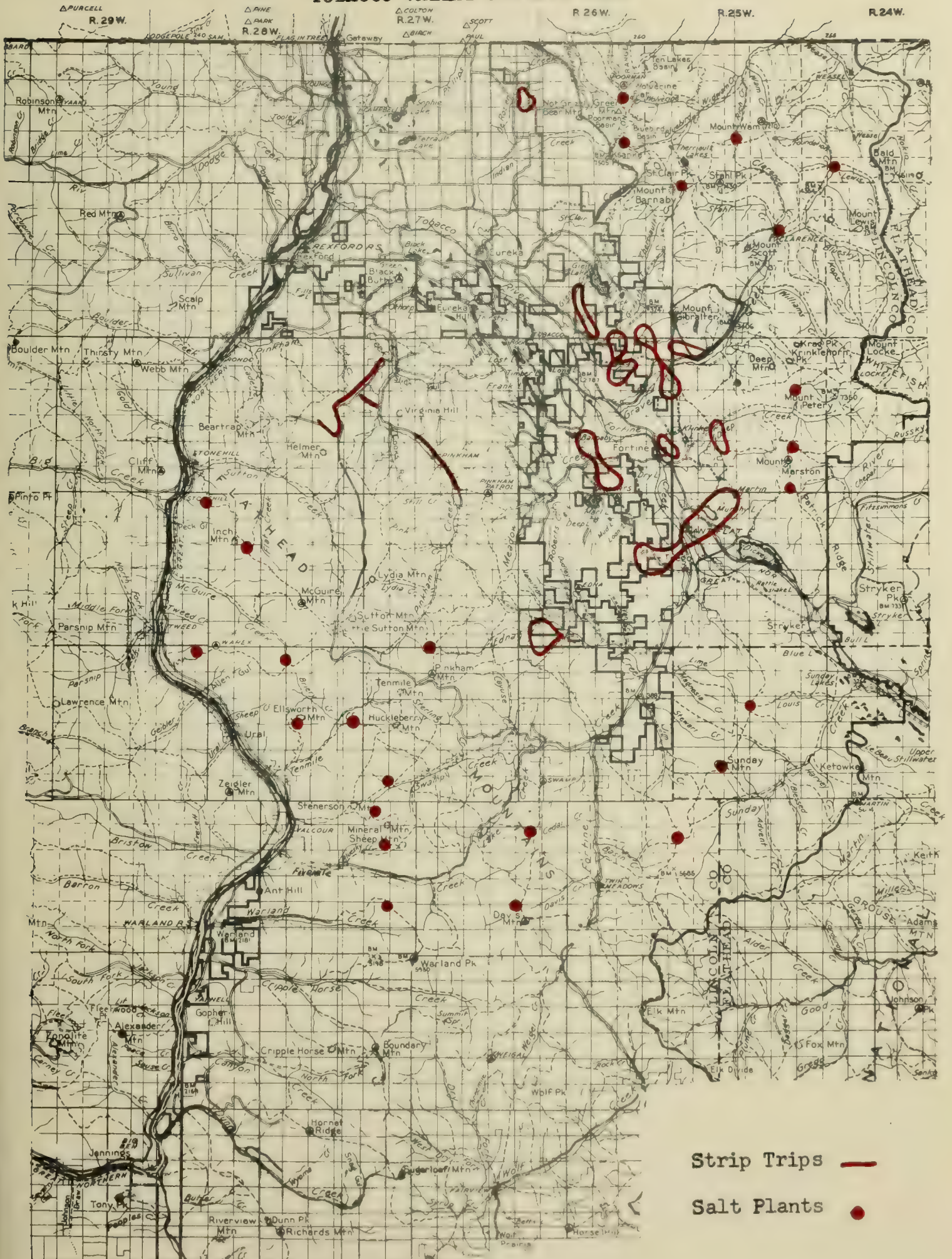
Trip	:	:	:	:	:
	: Strip Width:	Miles	: Acres	: Moose Seen	
	: In Yards	: Covered	: Covered	:	
	:	:	:	:	
Meadow Creek	: 200	: 4	: 290	:	
Trego-Dudley Slough	: 150	: 3	: 164	:	
Pinkham Creek	: 200	: 8	: 580	:	Tracks
Lower Pinkham	: 200	: 6	: 435	:	Tracks
Sutton Divide Road	: 200	: 8	: 580	:	1
Edna Creek	: 150	: 3	: 164	:	Tracks
	:	:	:	:	
Total	: 32	: 2213	:	:	1

TOBACCO VALLEY-FORTINE AREA





TOBACCO VALLEY-FORTINE AREA

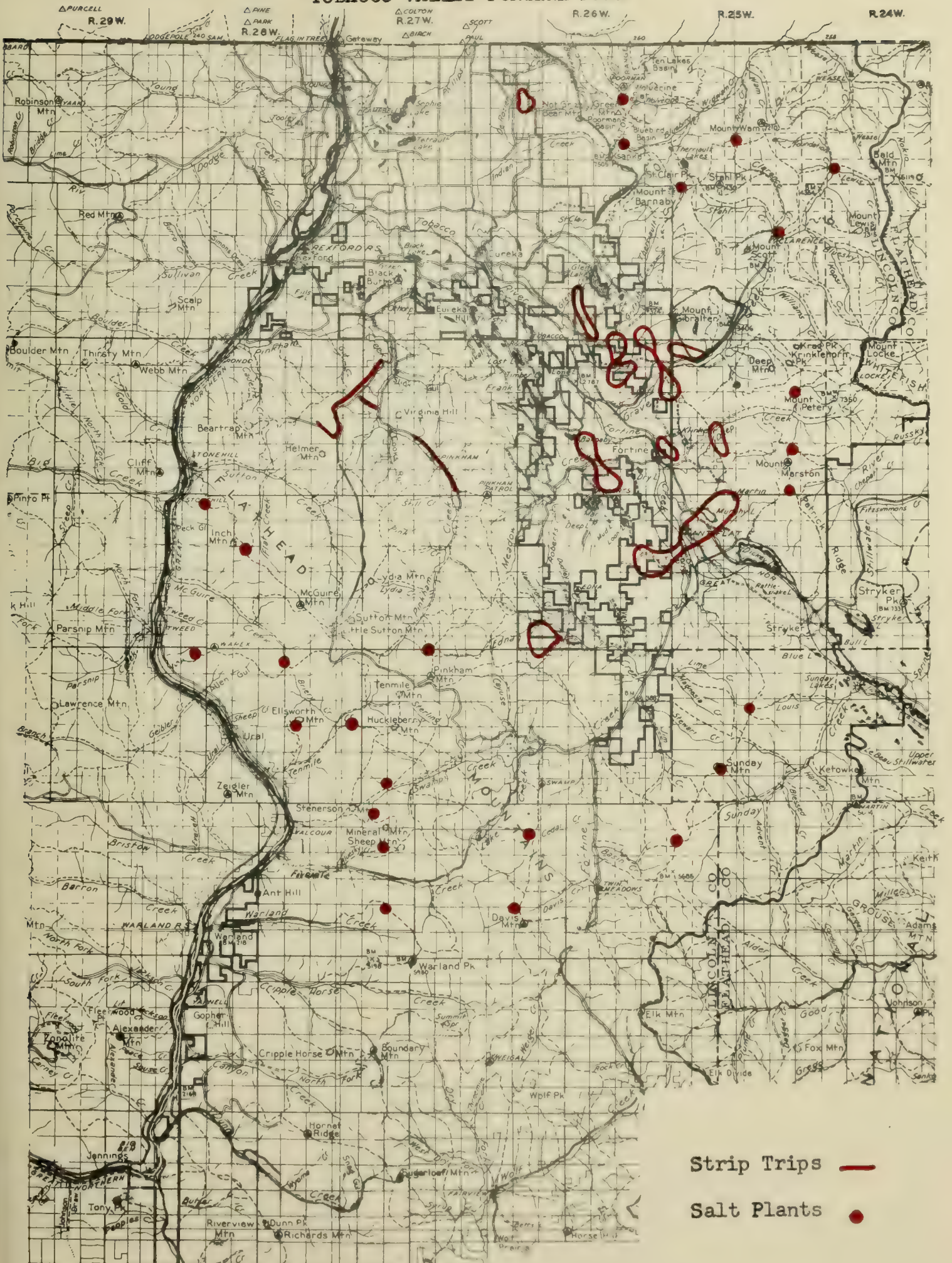


Strip Trips —

Salt Plants •



TOBACCO VALLEY-FORTINE AREA



Strip Trips —

Salt Plants •



PRINCIPAL BROWSE SPECIES IN USE

1. *Amelanchier alnifolia*. Serviceberry
2. *Prunus demissa*. Chokecherry
3. *Acer glabrum*. Mountain maple
4. *Ceanothus velutinus* Snowbush
5. *Arctostaphylos uva-ursi*. Kinnikinnick
6. *Odostemon aquifolium*. Oregon grape
7. *Lepargyrea canadensis*. Nannyberry
8. *Philadelphus lewisii* Mock orange
9. *Cornus stolonifera*. Dog wood
10. *Alnus tenuifolia*. Alder
11. *Betula fontinalis*. Red birch
12. *Salix* sp. Willow
13. *Symphoricarpos*. Common snowberry
14. *Ribes* sp. Currant
15. *Rosa* sp. Rose

SUB-UNIT NO. 3

GATEWAY-JENNINGS AREA

This area consists of the territory immediately adjacent to the Kootenai River from the Big Bend at Jennings to the Canadian Border. Elevations run from 2,000 to 6,000 feet. There are scattered farms along the Kootenai with the larger part of the area being forest land. Some parts of the unit, particularly the country between Tenmile Creek and Stonehill, are quite rugged and consist mostly of benches intersperced with rock cliffs. It is here that the Ural-Tweed Bighorn Sheep herd is found in this type of terrain.

Within this sub-unit there are approximately 34,000 acres of mule deer winter range and an equal amount of white-tail winter range. The two ranges coincide for the most part. Elevation of the winter range runs from 2,500 feet to about 4,000 feet. The principal range types are the:

1. Open yellow pine of the southwest exposures.
2. The growths along the stream bottoms.
3. The open grassy hillsides.
4. The Douglas fir, lodgepole, larch, association of the northeast slopes.

Range conditions in this area are somewhat better than in most parts of Lincoln County. There is some over-browsing in the Zeigler Mountain area. Ceanothus seems to be the primary food of the mule deer and is quite abundant throughout the range. In addition to the principal browse species some bitterbrush is found. This is most abundant on the Young Creek range.

Logging is being carried on at present around Warland section and

will eventually extend into the Rexford district.

COVERAGE

The same census methods were used in this sub-unit as in the other areas covered. One thousand and ninety acres were covered in the white-tail range, and 41 or .037 white-tail deer per acre were observed. Thirty-four thousand acres were estimated to be winter range. From these figures 1,258 white-tail deer were estimated to be in this sub-unit.

In the mule deer range, 3,796 acres were covered and 225 animals were seen. Based on the over-use of .059 deer per acre, the population was estimated at 2,006 animals. The total population of both species for the district is 3,264 deer or 61 deer per square mile of winter range. This amounts to 10.5 acres per deer.

The predominance of mule deer is probably attributable to the type of terrain which is typical of this sub-unit. Such high and rugged habitat usually supports more mule deer than white-tail. It is also possible that mule deer migrate from their summer range in the Wolf Creek, Fairview and Twin Meadows district.

No elk were observed during the survey, although a few tracks were seen last fall on Alexander and Jackson Creeks. A few elk are scattered throughout the Purcell Range, and also on the Dunn, Canyon and Cripple Horse Drainages. The latter may possibly be migrants from the Fairview district.

No moose or moose tracks were seen during the survey. Contacts with local residents indicate that moose occasionally travel through the area. There are probably a few residing in the Five and Tenmile sections which are adjacent to the Pinkham district. The Pinkham district is known

to support a number of moose.

URAL-TWEED BIGHORN SHEEP HERD

The range of this sheep herd, according to a study made in 1941 by B. W. Brink extends from Fivemile Creek to Beartrap Mountain on the eastside of the Kootenai River. Their winter range consists of approximately 23,680 acres. The major part of this range is within the mule deer winter range. The topography is characterized by benches, rocky cliffs, and steep slopes that are sparsely covered with yellow pine and Douglas fir. Mr. Brink's report contains a comprehensive description of this sheep range.

Three thousand and sixty-nine acres were covered by strips through the sheep range and 22 sheep were observed. This averages .0071 sheep per acre. From this per acre factor, it was estimated that a total population of 168 bighorns occupied this range. An additional 23 sheep were observed with binoculars from Highway #37 by looking across the Kootenai River onto the sheep range. Eighteen sheep, nine rams, six ewes and three lambs, of the 44 observed were classified. Fifteen others were identified as mixed ewes and lambs, and 11 were unclassified.

The large number of predators in the area may have adverse effects on the sheep population. Coyotes are particularly abundant along the railroad, where they are apparently attracted by the deer that are killed by trains. Several instances of coyotes killing lambs have been reported by local residents. A comparatively large number of bobcat tracks were seen on the sheep range. One mountain lion track was also seen in the region. The large number of golden and bald eagles that are seen along the Kootenai River may also be preying on the sheep herds.

TABULATION OF STRIP COUNTS FOR MULE DEER COVERAGE

IN THE GATEWAY-JENNINGS AREA

Trip	Strip Width In Yards	Miles Covered	Acres Covered	Mule Deer	Coyotes
Ellsworth Mountain	200	7	508	5	1*
Ellsworth Mountain	300	6	654	8	
Allen Gulch	300	7	763	85	4
Tenmile Creek	300	6.5	708	67	1
McGuire Creek	300	4	436	15	
Zeigler Mountain	300	6	654	34	
West Kootenai	100	2	73	11	
Total		38.5	3796	225	5

*Lion Track

TABULATION OF STRIP COUNTS FOR WHITE-TAIL DEER

COVERAGE IN GATEWAY-JENNINGS AREA

Trip	Strip Width: In Yards	Miles Covered	Acres Covered	White-tail: Deer	Coyotes
Bluesky Creek	200	2	145	13	
Warland Creek	150	4	218	5	1
Zeigler Mountain	300	6	654	19	
West Kootenai Road	100	2	73	4	
Total		14	1090	41	1

TABULATION OF STRIP COUNTS FOR COVERAGE OF THE
URAL-TWEED BIGHORN SHEEP HERD

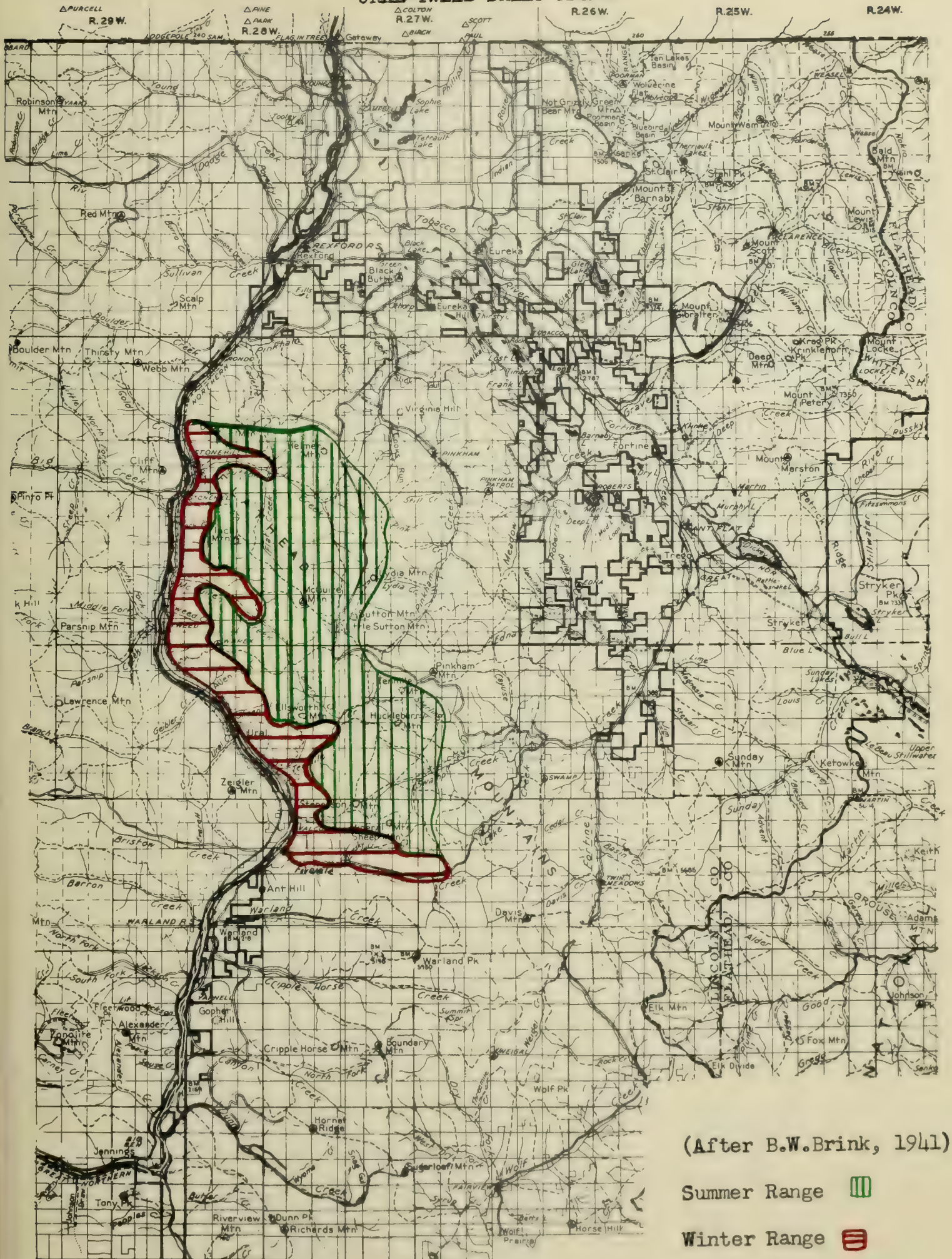
Trip	Strip Width: In Yards	Miles Covered	Acres Covered	Bighorn Sheep	Coyotes
Ellsworth Mountain	200	7	508	10	1*
Ellsworth Mountain	300	6	654	1	
Allen Gulch	300	7	763		4
Tenmile Creek	300	6.5	708		1
McGuire Creek	300	4	436	11	
Totals		30.5	3069	22	5

*Lion Track.


PRINCIPAL BROWSE SPECIES IN USE


1. *Amelanchier alnifolia* Serviceberry
2. *Prunus demissa*. Chokecherry
3. *Acer glabrum*. Mountain maple
4. *Ceanothus velutinus* Snow bush
5. *Arctostaphylos uva-ursi* Kinnikinnick
6. *Berberis aquifolium*. Oregon grape
7. *Cornus stolonifera*. Dog wood
8. *Philadelphus lewisii*. Mock orange
9. *Alnus tenuifolia*. Alder
10. *Purshia tridentata*. Bitterbrush
11. *Betula fontinalis* Red birch
12. *Salix* sp. Willow
13. *Symphoricarpos albus*. Common Snowberry
14. *Lepargyrea canadensis* Buffaloberry
15. *Ribes* sp. Gooseberry
16. *Rosa* sp. Rose

URAL-TWEED SHEEP RANGE

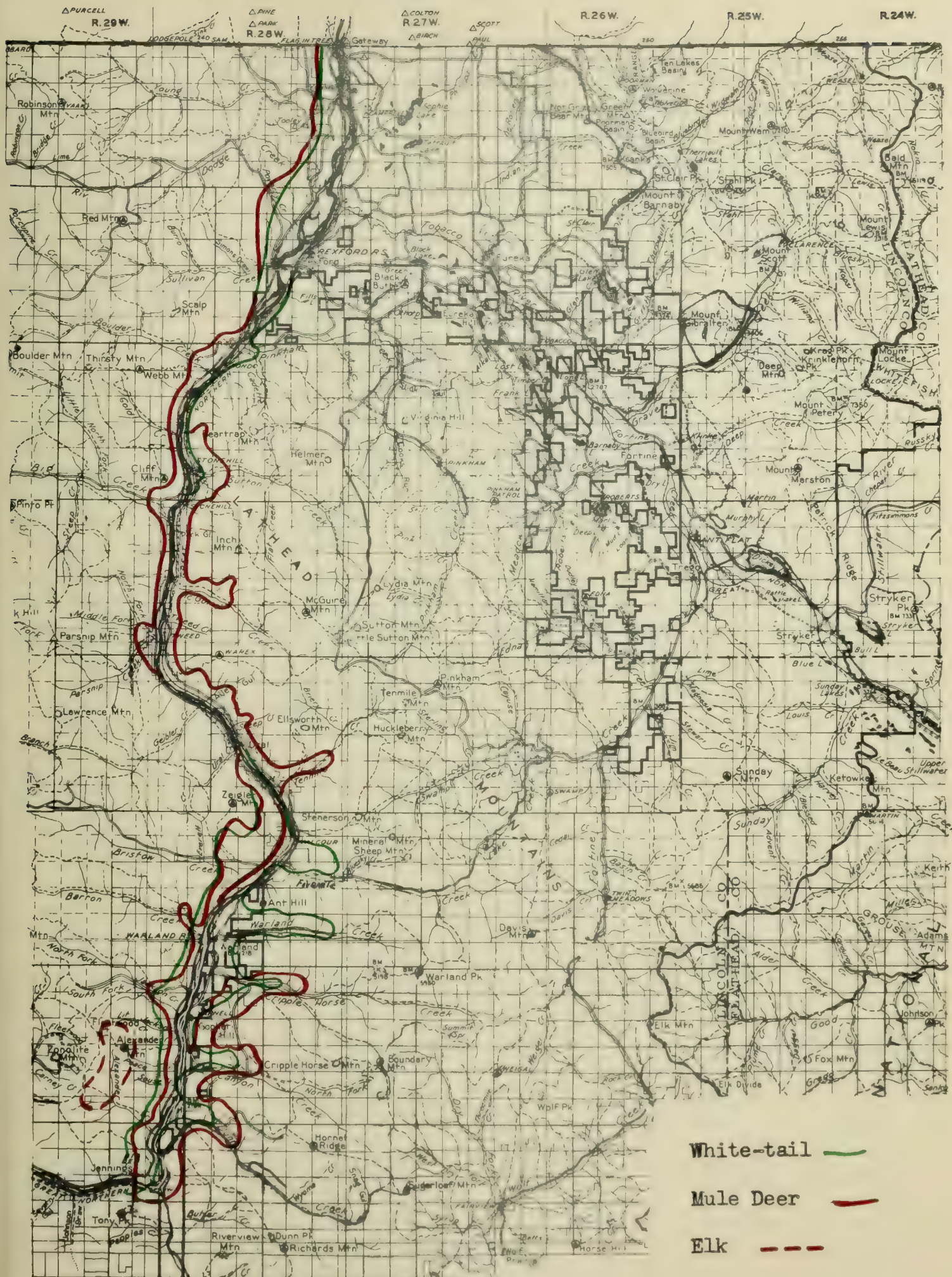


(After B.W.Brink, 1941)

Summer Range 

Winter Range 

GATEWAY-JENNINGS AREA



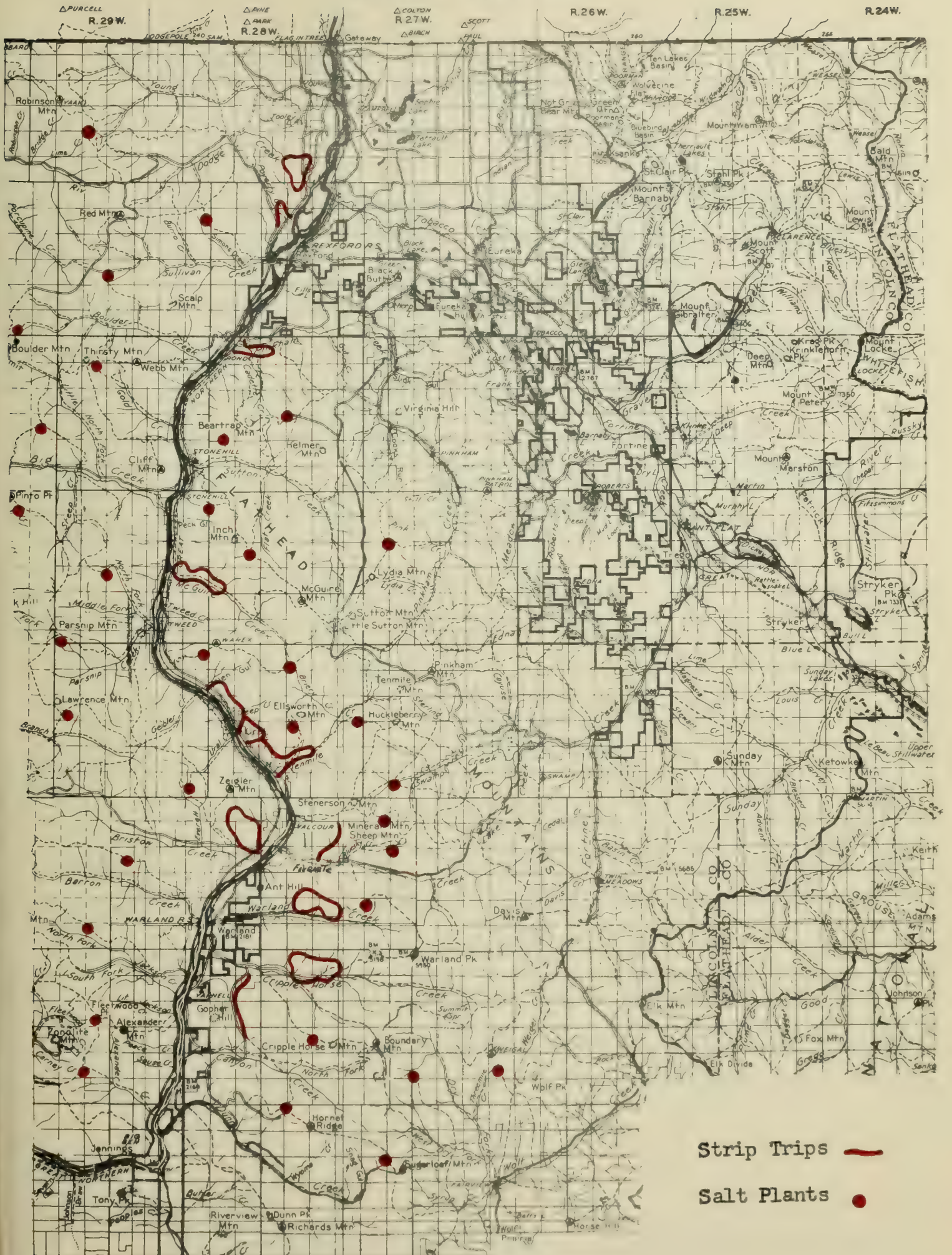
White-tail ———

Mule Deer ———

Elk - - - -



GATEWAY-JENNINGS AREA





SUB-UNIT NO. 4

LIBBY AREA

Sub-unit No. 4 includes the Kootenai Drainage from Jennings to Kootenai Falls. With the exception of the townsite of Libby and the scattered farms, most of this area consists of cut-over forest lands. Elevations range from about 2,000 to 6,000 feet except in the Cabinet Mountains southwest of Libby which runs up to 8,700 feet.

White-tail winter range consists of about 24,320 acres and mule deer range about 19,840 acres. These ranges overlap in many places. Elevations range from 2,000 to 4,500 feet. Cover types found are:

1. Open yellow pine.
2. Stream bottoms.
3. Open grassy hillsides.
4. Douglas fir, larch, lodgepole type of the north slopes.
5. Conifer reproduction.

Range conditions in this area are better than in any of the other sections covered. This might be attributed to the relatively small herd of deer which occupy the range. Accessibility and proximity to Libby probably account for the smaller population.

In addition to the regular key species, bitterbrush is found on the northside of the Kootenai from Rainy Creek to the Big Bend on the hills known locally as the Horse Range. This section provides winter sustenance for the majority of the deer in the Libby Unit.

COVERAGE

The same method was used for this census of 1,851 acres of range

in this unit as was used in other units. Fifty white-tail (.027 per acre) and 63 mule deer (.034 per acre) were counted within the area covered. By applying these values to 24,320 acres of white-tail range, it is estimated that there are approximately 656 white-tail deer in the sub-unit. On 19,840 acres of mule deer range, there is an estimated population of 674 animals, with a total population of 1,330 deer of both species within the unit. The area encompassed by both ranges includes about 68 square miles which amounts to 19.5 deer per square mile or 1 deer per 32.8 acres of winter range.

The only evidence of elk found during the survey in the Libby section was on Coyote Creek and Elliot Draw where tracks were seen. These may be the same animals that range in the Tepee, Squaw and Harris Creek sections of the Fisher Drainage. Reports indicate that a few elk are scattered throughout the unit. South of the Kootenai the principal elk range is in the Horse Mountain area and parts of the McMillan Range. North of the Kootenai they are dispersed throughout the entire area.

During the survey no moose were seen. It is known, however, that moose inhabit the area around Loon Lake in the Pipe Creek section, and the area south of the Kootenai that lies between Flower Point and Little Hoodoo Mountain. There are also some moose around Howard Lake in the Libby Creek area.

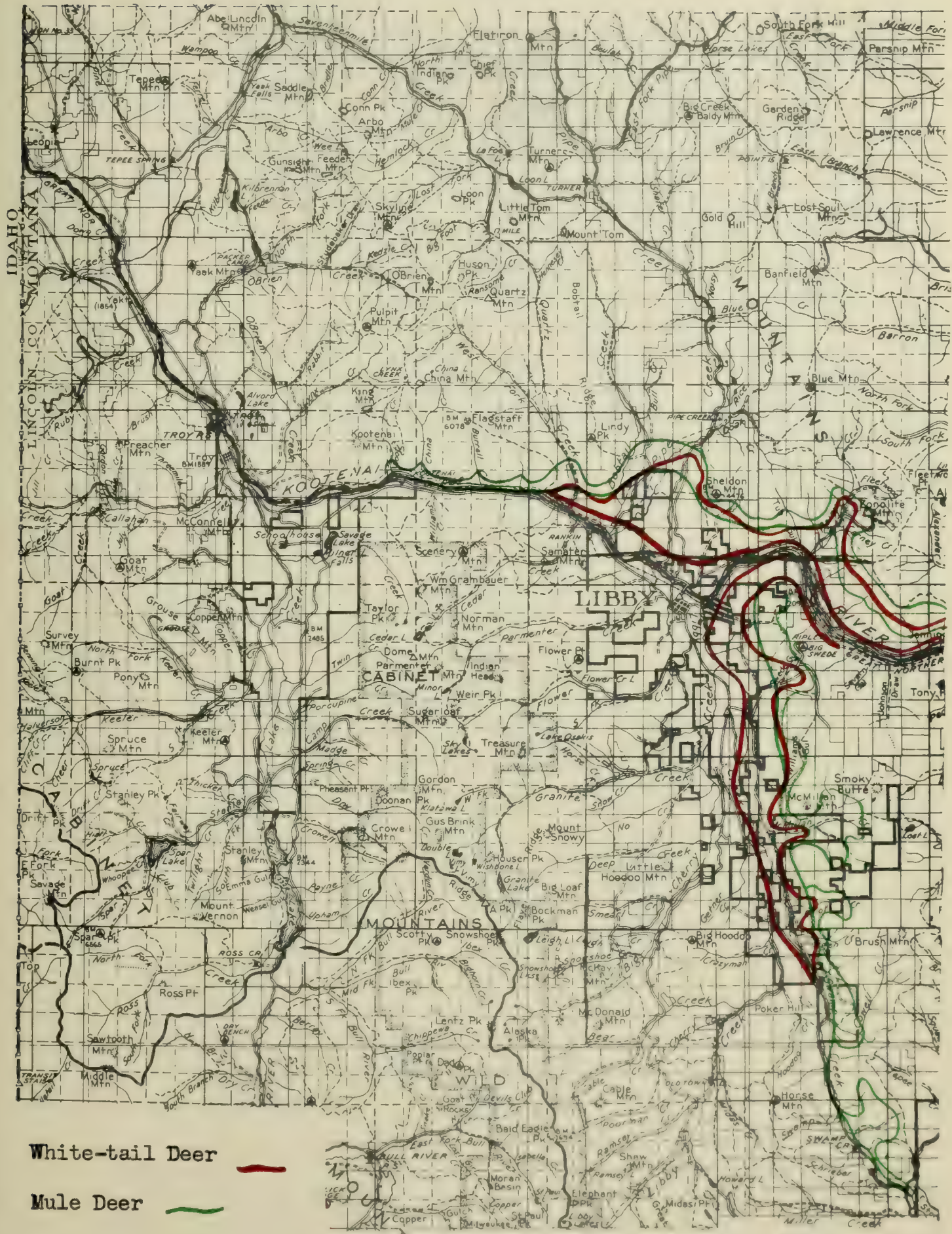
TABULATION OF STRIP COUNTS IN
THE LIBBY AREA

Trip	Strip Width: In Yards	Miles Covered	Acres Covered	White-tail Deer	Mule Deer
Coyote Creek	150	8	436	1	4
Swede Mountain	200	6	435	4	14
Canoe Gulch	200	5	363	11	29
Kennedy Gulch	400	2	290	22	7
Sheldon Mountain	200	3	218	7	9
Schrieber Lake	150	2	109	5	
Total		26	1851	50	63

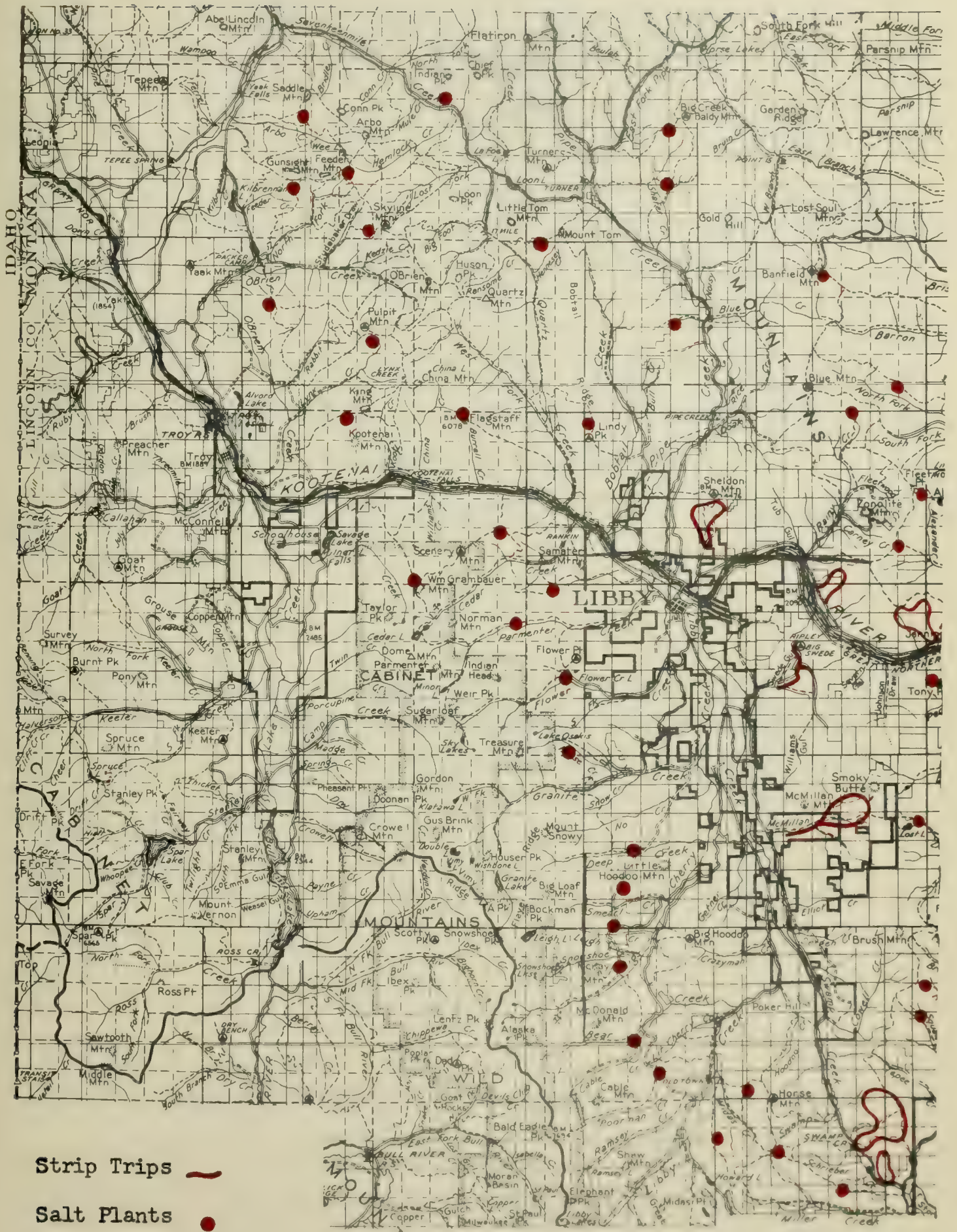
PRINCIPAL BROWSE SPECIES IN USE

1. *Amelanchier alnifolia* Serviceberry
2. *Prunus demissa*. Chokecherry
3. *Acer glabrum*. Mountain maple
4. *Ceanothus velutinus* Snow bush
5. *Arctostaphylos uva-ursi* Kinnikinnick
6. *Purshia tridentata*. Bitterbrush
7. *Odostemon acquifolium* Oregon grape
8. *Cornus stolonifera*. Dog wood
9. *Philadelphus lewisii*. Mock orange
10. *Alnus tenuifolia*. Alder
11. *Betula fontinalis* Red birch
12. *Salix* sp. Willow
13. *Symphoricarpos albus*. Snowberry
14. *Lepargyrea canadensis* Nannyberry
15. *Ribes* sp. Gooseberry
16. *Rosa* sp. Rose

LIBBY AREA WINTER RANGE



LIBBY AREA



Strip Trips —

Salt Plants ●



SUMMARY OF LINCOLN COUNTY MANAGEMENT UNIT

1947-1948

As previously explained, this unit has been divided into management sub-units. These sub-units have been selected from topographical and biological criteria.

In each case certain divisions make the big game herds a unit and each has slightly different management problems. For this reason and for convenience in study, each sub-unit is reported separately.

The following is a summary of data for all units with recommendations for game management.

WHITE-TAIL SEX RATIOS

TABULATION OF WHITE-TAIL DEER SEEN DURING SURVEY ON AND OFF STRIP

Unit	Buck	Doe	Fawn	Unclassified	Total
Wolf Creek-Fisher	23	118	106	736	983
Tobacco-Fortine	7	10	13	128	158
Gateway-Jennings	9	16	15	27	67
Libby	5	14	16	42	77
Totals	44	158	150	933	1285

A digest of the above table shows a ratio of one white-tail buck to 3.6 does. Although this is a good buck-doe ratio, it doesn't show a true picture of the buck population. Because of mild winter conditions,

the bucks had shed their antlers before any appreciable concentrations were found. Thus the only positive means of identifying bucks was by observing their antler scars which resulted in the placing of a lot of bucks in the unclassified group. Under these circumstances, it is felt that the true buck ratio would be even higher. From the limited number of deer seen up to the period when antler-shedding began, a ratio of one buck to 2.3 does was found. This is probably closer to the true ratio, but the number of deer seen during that period was too small to base any statistics on.

It will be noted that the above table shows a ratio of .94 fawns per doe.

It might be noted that a comparison to the 1941-42 study shows an increase of .75 does per buck, and a .41 decrease of fawns per doe.

MULE DEER SEX RATIOS

TABULATION OF MULE DEER SEEN DURING SURVEY

Unit	Buck	Doe	Fawn	Unclassified	Total
Wolf Creek-Fisher	3	10	4	66	83
Tobacco-Fortine	6	11	15	198	230
Gateway-Jennings	36	73	67	166	342
Libby	8	14	13	25	60
Totals	53	108	99	455	715

The above table shows a ratio of one buck to two does. This probably shows a better picture of the buck-doe ratio than in the case

of the white-tails, since the mule deer retain their antlers longer than the white-tails do.

The table also shows .91 fawns per doe.

Reference to the 1941-42 study shows a ratio increase of .71 does per buck, while the doe-fawn ratio remains practically the same.

TRENDS AS SHOWN BY PAST GAME STUDIES

The only comparison showing trends in deer population can be made in the Wolf Creek-Fisher Area. Information dating back to the study by West and Bealey in 1934-1935 showed a population of 4,919 white-tail deer for this area. In a study made by Bergeson in 1942, a population of 5,500 white-tail deer was shown. The 1947-1948 study indicates a population of 7,010 deer. These figures show an increase of 11% from 1935 to 1942 and a 27% increase from 1942 to 1948. The overall increase from 1935 to 1948 is 79%. In the report by Bealey and West, the range was considered properly stocked for a normal winter, and it was believed that a large loss would have occurred under unfavorable winter conditions. In Bergeson's 1942 report the range is considered badly over-utilized. The same condition was found to exist in the 1947-1948 study. Thus an apparent population increase of 27% from 1942 to 1948 on a range which was considered badly over-utilized in 1942 indicates a definite need for intensive work on the whole subject of deer food habits, ranges, and range utilization.

HUNTER HARVEST

Data obtained through hunter contacts during the 1947 hunting season indicate that 32% of the hunters in Lincoln County were residents of said

County. It is known that 2,062 hunting licenses were sold in Lincoln County, and from this it is ascertained that the total number of hunters in the county was 6,440. Data also indicated a hunter success of 15%, disclosing a kill of 966 bucks. These same data (see "Lincoln County Deer Kill for 1947 Hunting Season") showed 70% of the bucks or 676 to be white-tail and 30% or 289 were mule deer. It is suggested that a further check can be made when the license stub data is compiled. It should be remembered that these figures refer to the legal kill only. While there is no way to make an estimate of the illegal kill, it is felt that it is considerably higher than the legal kill.

A coverage of approximately two thirds of the county indicated a population of about 17,000 deer of both species for the area covered. This shows a legal hunter utilization of 5.7% of the herd. If the rest of the county were taken into consideration, the percentage would be even lower. This again indicates the need for an intensive investigation of the deer situation.

NATURAL LOSSES

Natural losses appeared to be negligible this winter. During the entire survey the carcasses of nine deer were found, three of which were probable coyote kills. Conditions of the snow were favorable to the deer and the predator kill is thought to be slight. There seems to be a considerable number of coyotes throughout the area. During the survey a total of thirty-three were seen.

Disease appears to be an unimportant factor in natural losses. In the few post-mortems made, the only parasites noted were footworms. These appeared to be more prevalent in the mule deer.

No information is available on highway and railroad losses at this time, but will be included later.

PROBLEMS AND PROBLEM AREAS

Refer to reports on individual units of the survey.

RECOMMENDATIONS FOR MANAGEMENT

UTILIZATION

It is felt that no recommendation can be made regarding the number to be removed. It is known that there are two problem areas, but as previously pointed out, the census shows an increase in population although observations have shown and still indicate over-browsing. Furthermore, the carrying capacity of the range is not known at this time and only by a thorough range study can the capacity and consequent proper harvest be determined.

There are three methods which might be considered in dealing with the over-populated areas. One of these is the trapping and transplanting of deer from concentration areas to areas which are under-utilized. There are various sections which are potentially winter range but do not suffer the heavy pressure that the problem areas do. One of these areas is the south end of the McMillan Range. Just why more deer do not winter in this area is not known, but it is thought that the migratory trend for the Fisher Drainage is down the main valley, thus by-passing the west slopes of the McMillan Range. Another winter range which shows less utilization is the Quartz Creek-Sheldon Mountain Area. This work

would necessarily be done while the concentration period existed and the snow tended to discourage the deer from wandering off their newly acquired range. It seems reasonable to assume that if starving deer are transplanted in a section which provides adequate forage their tendency would be to remain in that vicinity. Whether or not this would lead to the development of an ancestral wintering ground is a matter of conjecture, but the suggestion is offered primarily as a means of alleviating the conditions which would accompany a particularly severe winter, and if practical would serve its purpose as such.

Another method which hasn't been given much consideration in the past is the reseeding or replanting of the primary browse species or the introduction of new species such as bitterbrush for instance, which grows profusely in sections along the Kootenai River, but is not found at all in the Wolf Creek or Grave Creek Areas. The development of techniques relative to this work would probably require considerable research and experimentation, and might be included in a range study.

The last and simplest method would be the removal of a pre-determined number of antlerless deer from the concentration areas. This would probably be more effective if accomplished after the regular hunting season. From the general reaction of the sportsmen in the Eureka district who experienced a short doe season in 1946, it is felt that the issuance of a pre-determined number of special antlerless licenses either by drawing or on a first-come-first-served basis would meet with far greater approval than a wide-open antlerless season.

Considering the fact that there is potential winter range not being fully utilized, if a re-distribution of deer were possible, it would seem

to be more satisfactory than a reduction of the herd.

The continuance of the buck law appears to be favored by the majority of sportsmen in Lincoln County. Among the dissenters, the chief argument seems to be that there are too many dry does due to the lack of bucks, but sex ratio findings do not support that theory.

On the basis of this survey and contacts, it seems desirable to continue the complete protection of elk and moose since there is no appreciable competition for range between them and the deer herd.

It is considered beneficial to make an administrative closure of the area bounded on the south and east by Libby Creek, on the north by the Kootenai River and on the west by the crest of the Cabinet Range. This area has a rather sparse deer population, part of which winters on the McMillan Range which is capable of wintering more deer than at present. Due to the proximity of this area to Libby and the number of accessible roads, a strict law enforcement campaign would probably be necessary to prevent excessive law violation. This closure should be set up not with the idea of permanence, but as the inauguration of a program of rotating closures. The maximum time of its existence would probably not exceed three years.

MANAGEMENT OF HABITAT

SALTING PLANS

Salting plan maps accompany the reports on the various units. At the present time salt is transported and planted by Forest Service pack-trains in the fall when the lookouts are being packed down. Thus, the

distribution of salt is limited to the areas along the trails to lookouts being used. Lack of facilities prevents the making of special trips for the sole purpose of planting salt in many of the spots designated in the salt plan. Correction of this would probably have to be worked out by the State. Salt utilization would have to be checked at each plant and the replenishment correlated with the amount consumed. On the basis of an average of 75 pounds per plant, approximately 8,500 pounds of salt would be needed for the present plan.

RESEEDING

As previously pointed out, some worthwhile work might be done in regard to the replanting of browse species and the introduction of new species such as bitterbrush on the over-browsed areas. An interesting study could be made in conjunction with the logging operations being carried on throughout the Kootenai Forest at the present time.

COOPERATION WITH PRIVATE LAND-OWNERS

The greatest percentage of the land in Lincoln County is owned by the Forest Service and the J. Neils Lumber Company, with the exception of the Grave Creek Area, where some of the winter deer range is found on land owned by ranchers. No cooperative agreements exist with any private land-owners.

TABULATIONS

(SEE MAPS)

WEATHER INFORMATION RECEIVED FROM LIBBY RANGER STATION

Month	Average Snow Depth In Inches	Minimum Temperature For Month	Total Precipitation In Inches
October	None	30 degrees	4.89
November	"	12 "	1.18
December	2.5	12 "	1.71
January	7.2	-10 "	2.44
February	8.1	-15 "	2.86
March	2.8	- 4 "	1.54

ABUNDANCE OF BIG GAME, FUR BEARERS,
PREDATORS, AND GAME BIRDS

Species	A*	P*	C*	S*	R*
BIG GAME:					
white-tail deer		X			
mule deer			X		
elk				X	
moose				X	
FUR BEARERS:					
beaver			X		
muskrat				X	
weasel				X	
marten				X	
mink				X	
fisher					X
otter					X
PREDATORS:					
coyote		X			
mountain lion				X	
bobcat			X		
lynx				X	
GAME BIRDS:					
blue grouse				X	
ruffed grouse			X		
Franklins grouse					X

*A-Abundant
P-Plentiful
C-Common
S-Scarce
R-Rare

WHITE-TAIL DEER SEEN ON STRIP

Range Unit	Approx. Acreage Winter Range	No. Counted	Additional Estimate	Total
Wolf Creek-Fisher	34,080	632	6,378	7,010
Tobacco-Fortine	35,200	163	2,019	2,182
Gateway-Jennings	34,000	41	1,217	1,258
Libby	24,320	50	606	656
Totals	127,600	886	10,220	11,106

MULE DEER SEEN ON STRIP

Range Unit	:Approx. Acreage:	No.	:Additional:	Total
	: Winter Range :	Counted	: Estimate :	
Wolf Creek-Fisher	Unknown	98	502	600
Tobacco-Fortine	32,640	207	2,371	2,578
Gateway-Jennings	34,000	225	1,781	2,006
Libby	19,840	63	611	674
Totals	86,480	593	5,265	5,858

June 1, 1948

Submitted by:
Ade Zajanc, Fieldman
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

SWAN-BLACKFOOT UNIT

BIG BLACKFOOT-CLEARWATER BIG GAME WINTER SURVEY

1947-1948



Submitted by:
Frank Gummer, Fieldman
R. H. Evers, Fieldman
Wildlife Restoration Division

May 6, 1948

TABLE OF CONTENTS

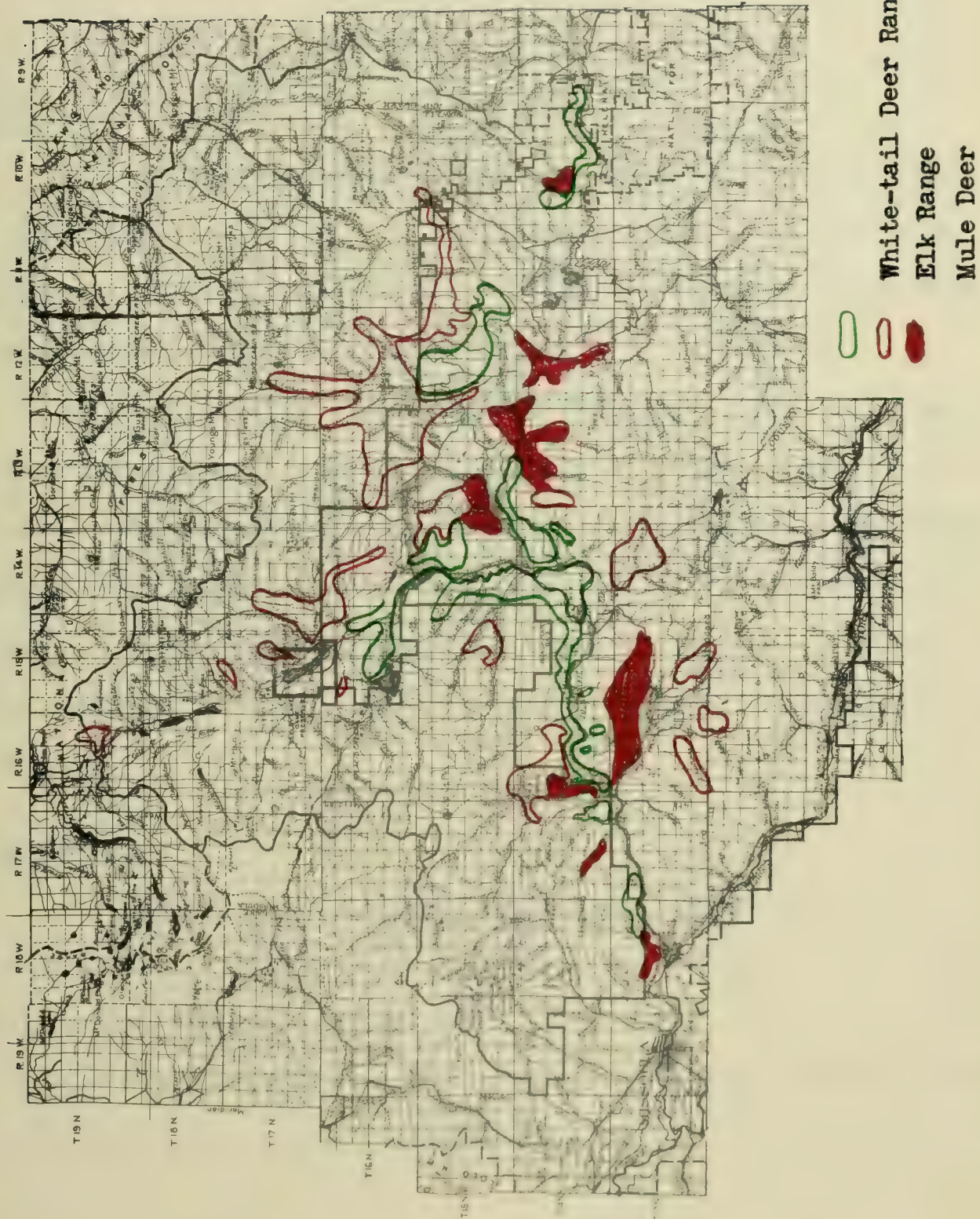
	<u>Page</u>
Introduction.	60
Acknowledgements.	60
Personnel.	60
Physical Features.. . . .	61
Land-Use Economy.	61
Historical Data	63
Use By Domestic Livestock	64
Hunting Pressure.	65
Weather Conditions.	65
Census Techniques	66
Tables	
Sex Ratio and Percent of Young.	67
White-tail Deer Census, 1947-1948	68
Mule Deer Census, 1947-1948	69
Elk Census, 1947-1948.	70
Sub-Unit No. 1	
Gold Creek: Sheep Flats to Prairie Creek	72
Sub-Unit No. 2	
Elk Creek - Bear Creek.	73
Sub-Unit No. 3	
Clearwater-Sperry Grade	75
Sub-Unit No. 4	
Salmon Lake Hills, Owl Creek, Fish Lake and Drew Creek.	76
Sub-Unit No. 5	
Cottonwood Creek-Boyd Ranch.	77
Sub-Unit No. 6	
Monture-McCabe Creek.	79
Sub-Unit No. 7	
Dick Creek-Warren Creek-Ovando Mountain	80

(Continued)

Table of Contents (Continued)

	<u>Page</u>
Sub-Unit No. 8	
Coopers Lake-Markham Mountain.	81
Sub-Unit No. 9	
Lincoln Canyon.	82
Sub-Unit No. 10	
Monture Hill-Blackfoot River Breaks.	84
Sub-Unit No. 11	
Pearson Creek-Chamberlain Creek.	85
Sub-Unit No. 12	
Sheep Mountain-McNamara Landing-Greenough Divide	86
Conclusions.	87
Recommendations.	88
Map	
Game Range and Units	59

Game Range in the Big Blackfoot-Clearwater Area



BIG BLACKFOOT-CLEARWATER BIG GAME WINTER SURVEY

1947-1948

INTRODUCTION

To facilitate the management program set up by the Montana Fish and Game Department, a series of big game management units have been established. It is planned to make detailed studies within these areas at approximately five year intervals.

One of these units, Swan-Blackfoot Unit, was first studied by the Wildlife Restoration Division during the winter of 1942-1943. At that time estimates were made, winter game range mapped, and general recommendations prepared. Due to changing conditions within the area, increased hunting pressure, and complaints by ranchers, it was felt necessary to study this unit during the winter of 1947-1948. A two-man crew was assigned to this unit.

ACKNOWLEDGMENTS

Crew members wish to express their appreciation for the use of Forest Service facilities and for the excellent cooperation given by Rangers Lukens, Bowers, Godfrey, and York.

Also the use of private cabins belonging to Fred Thibadean and the Karkanen Brothers, which were especially helpful.

PERSONNEL

Frank Gummer and R. H. Evers worked in this area intermittently from December 1, 1947 to April 3, 1948. A total of 112 man-days were

spent in covering a major portion of the critical winter range.

The use of a jeep greatly facilitated ground coverage, as indicated in the following tabulation:

Means of Travel	Nov.	Dec.	Jan.	Feb.	March	April
Car	160	609	626	686	826	232
Snowshoe and foot		107	62	61	52	12

PHYSICAL FEATURES

This unit comprises approximately 2,064 square miles. Of this area, only about 195 square miles or 9.4% are available during the critical winter period. The study area starts at Bonner and extends up the valley about 70 miles. This valley floor varies in width from a quarter-mile to 15 miles. The elevation at Bonner is approximately 3,000 feet and at Lincoln 5,000 feet. This unit varies from broad sage and grass bottomlands to very rugged terrain at the stream headwaters. The timber on the south slopes are primarily of the yellow pine-Douglas fir types. The browse associated with this type is mountain maple, serviceberry, chokecherry, willow, and ceanothus. On the north slopes, Douglas fir is dominant; dog wood, alder, willow, quaking aspen, and mountain maple are common browse species.

LAND-USE ECONOMY

The economy of the area centers around the logging industry. Approximately 225 men are supported directly from lumbering interests and about 100 men work in the smaller mills which run only part-time.

Several bands of sheep coming from adjacent valleys graze a portion of this winter range in summer and several large cattle ranches occupy range that would normally be winter range for deer and elk. This competition creates the chief problem in this unit.

Dude ranches which are mostly combination livestock and recreation units, form an important part of the economy of the area. Big game offers attraction and income to 14 known dude ranchers and commercial packers. Shown below is a list of the dude ranches and commercial packers known to have operated in the past summer.

Name of Dude Ranch or Commercial Guide	:	Operating From or at
Tamarack Resort	:	Seeley Lake
Wapiti Lodge	:	Seeley Lake
Allen Morse	:	Seeley Lake
Double Arrow Ranch	:	Seeley Lake
E-L Ranch	:	Greenough
Lee Cahoon	:	Greenough
Copenhaver Brothers	:	Ovando
Claude Reinochle	:	Ovando
James B. Murphy	:	Ovando
F. E. Prochnow	:	Ovando
John Baird	:	Ovando
Plummer Ranch	:	Ovando
Edward Geary	:	Ovando
Coles R. McNally	:	Ovando

HISTORICAL DATA

Much of the game history of the Big Blackfoot has been lost, however, some references indicate early day presence of species now extinct.

In 1892, Arthur L. Stone, in his book "Following Old Trails", described coming down the Blackfoot and finding a bighorn ram near Blueside. This area is about three miles above Bonner.

Two skulls of bighorn rams were discovered near McNamara landing in 1937 during excavation for bridge abutments.

Buffalo skulls have been found on Kleinschmidt flat east of Ovando and two were found at the junction of the Dry Fork and the North Fork near the present site of the North Fork Ranger Station.

Comparative data on big game populations is available for only two years. These are included in the tabulations below and indicate actual counts for the area in 1942-43 as compared to 1947-48.

White-tail Deer

Year	Actual Count	Estimate	Total	Carrying Capacity
1942-1943	1,124	1,410	2,534	2,150
1947-1948	1,348	946	2,294	2,140

Actual count increase: 224 white-tail.

Mule Deer

Year	Actual Count	Estimate	Total	Carrying Capacity
1942-1943	298	460	758	700
1947-1948	1,161	670	1,831	2,132

Actual count increase: 863 mule deer.

Elk

Year	Actual Count	Estimate	Total	Carrying Capacity
1942-1943	214	415	629	800
1947-1948	356	479	835	1,065

Actual count increase: 142 elk.

These figures indicate an increase of all species, however, the great difference in the number of mule deer during the two studies is not indicative of a phenomenal increase, since good mule deer habitat was covered in 1947-48 that was missed during the earlier study.

USE BY DOMESTIC LIVESTOCK

In 1930 the Forest Service permitted 18 bands of sheep to graze in this area during the summer period. During recent years no sheep have been allowed on the Forest. This was done to protect watershed drainage from over-grazing.

At one ranch where game had caused complaints of haystack damage, hay has been baled and stored in a large shed. This resulted in the game moving to adjacent range as no haystacks were available.

Another example of changing elk range from private land was found on Elk Creek. Considerable use of haystacks by elk had occurred and elk-proof haystack fences were constructed three years ago. Now, although elk are found on the adjacent browse winter range, ~~more~~^{more} are found on the meadows.

HUNTING PRESSURE

Because of its nearness to Missoula, a large population center, this region has been subjected to a constantly increasing hunting pressure. Local interest and demand make this unit one of vital importance. Normally the hunter take is largest following heavy snows and often more game is killed the last week than during the previous three weeks.

Management practices in the Blackfoot district have since 1933 restricted deer harvesting to antlered bucks and permitted hunting of either sex of elk from October 15th to November 15th. However, it has been necessary on two occasions to conduct special hunts on the Boyd ranch to alleviate complaint of elk damage.

The first such season was in 1938 when the area was opened to the hunting of either sex. It is estimated that over 100 elk were killed.

In 1948 a special hunt was conducted by use of special permits. Thirty permits were issued for hunting from December 22nd to January 31st. This hunt was not popular with local sportsmen, many receiving permits refused to use them and less than 19 elk were taken. It is doubtful if any good was accomplished by this hunt.

WEATHER CONDITIONS

The winter of 1947-1948 was not a period of deep snow, however, it was a winter that made foraging difficult for game. Snow fell early, crusted in December and remained in this condition during most of the winter. Elk were found in areas of almost four feet of snow, however, the normal winter range was characterized by a much lower snow depth. In the game wintering area, the average snow depth was 10:25 inches on the south slopes, 17:5 inches on the level and 30:75 inches on the north slopes. Shown

below is the average monthly snow depths and the winter average.

Area	December	January	February	March	Average
South Slopes	13	13	9	6	10:25 inches
North Slopes	25	30	32	36	30:75 inches
Level	18	20	15	17	17:5 inches

CENSUS TECHNIQUES

Census methods used in the survey depended upon extensive coverage of all wintering areas. Travel was designed to cut through the representative range and to count as much game as possible. Fresh tracks were used in addition to the actual count to determine estimates. Each crew member estimated the carrying capacity of the area covered that day with relation to the existing population and potential.

During the first part of the winter some time was spent in each unit getting sex ratio data. After shedding of antlers started, the main emphasis was placed on getting total population estimates.

The Swan-Blackfoot Unit has been divided into 12 units for convenience in study and reporting. These units are outlined on the map at the beginning of this report.

Following is a tabular summary of the Swan-Blackfoot Unit.

Sex Ratio and Percent of Young

Species	Male	Female	Young	Total	Sex Ratio	Percent of Young
White-tail	35	151	150	336	1:4.3	44.6
Mule deer	78	294	355	727	1:3.7	48.
Elk	18	54	46	118	1:3	38.

WHITE-TAIL DEER CENSUS 1947-1948

SWAN-BLACKFOOT UNIT

Area	Actual Count	Estimate	Total	Carrying Capacity
No. 1 Sheep Flats to Prairie Creek, Sunflower Mtn.	375	224	599	400
No. 2 Elk Creek-Bear Creek	--	--	--	--
No. 3 Clearwater, Sperry Grade	242	58	300	300
No. 4 Salmon Lake Hills, Owl Creek, Fish Lake & Drew Creek	376	204	580	400
No. 5 Cottonwood Creek, Boyd- Bandy Ranch	--	--	--	--
No. 6 Monture-McCabe Creek	31	84	115	200
No. 7 Dick & Warren Creeks, Ovando Mountain	18	125	143	200
No. 8 Coopers Lake, Markham Mountain	117	33	150	150
No. 9 Lincoln Canyon	92	100	192	200
No.10 Monture Hill, Blackfoot River Breaks	17	8	25	40
No.11 Pearson Creek-Chamber- lain Creek	26	60	86	100
No.12 Sheep Mountain, McNamara Landing, Greenough	54	50	104	150
Totals	1,348	946	2,294	2,140

MULE DEER CENSUS 1947-1948

SWAN-BLACKFOOT UNIT

Area	Actual Count	Estimate	Total	Carrying Capacity
No. 1 Sheep Flats to Prairie Creek, Sunflower Mtn.	198	235	433	500
No. 2 Elk Creek-Bear Creek	47	23	70	200
No. 3 Clearwater, Sperry Grade	147	53	200	200
No. 4 Salmon Lake Hills, Owl Creek, Fish Lake & Drew Creek	285	65	350	300
No. 5 Cottonwood Creek, Boyd- Bandy Ranch	—	—	—	—
No. 6 Monture-McCabe Creek	—	—	—	—
No. 7 Dick & Warren Creeks, Ovando Mountain	36	14	50	125
No. 8 Coopers Lake, Markham Mountain	73	39	112	112
No. 9 Lincoln Canyon	1	—	1	—
No. 10 Monture Hill, Blackfoot River Breaks	228	72	300	300
No. 11 Pearson Creek, Chamber- lain Creek	96	44	140	145
No. 12 Sheep Mountain, McNamara Landing, Greenough	50	125	175	250
Totals	1,161	670	1,831	2,132

ELK CENSUS 1947-1948

SWAN-BLACKFOOT UNIT

Area	Actual Count	Estimate	Total	Carrying Capacity
No. 1 Sheep Flats to Prairie Creek, Sunflower Mtn.	63	48	111	175
No. 2 Elk Creek, Bear Creek	36	64	100	125
No. 3 Clearwater, Sperry Grade	3	12	15	25
No. 4 Salmon Lake Hills, Owl Creek, Fish Lake & Drew Creek	73	65	138	165
No. 5 Cottonwood Creek, Boyd- Bandy Ranch	76	24	100	100
No. 6 Monture-McCabe Creek	55	120	175	200
No. 7 Dick & Warren Creeks, Ovando Mountain	14	83	97	100
No. 8 Coopers Lake, Markham Mountain	9	24	33	50
No. 9 Lincoln Canyon	--	7	7	--
No. 10 Monture Hill, Blackfoot River Breaks	--	--	--	--
No. 11 Pearson Creek, Chamber- lain Creek	27	7	34	75
No. 12 Sheep Mountain, McNamara	--	25	25	50
Totals	356	479	835	1,065



White-tail Deer on Salmon Lake hills.
Note heavily Browsed Service berry.



Typical Winter Range in Blackfoot-
Clearwater Unit. Salmon Lake Area

SUB-UNIT NO. 1

GOLD CREEK: SHEEP FLATS TO PRAIRIE CREEK

GENERAL DESCRIPTION

This area all lies north of the Big Blackfoot River and east of Gold Creek including Belmont, Blanchards, Lost Horse and Prairie Creeks. Sub-unit No. 1 is primarily white-tail range, but has a few mule deer and elk. A heavy concentration of deer was found on the lower south slopes of Sunflower Mountain and in the flats along the Blackfoot River known as Sheep Flats. Some deer were found all along, but the next local concentration was found at Blanchard and another at the mouth of Prairie Creek.

Predators were numerous in this sub-unit. It is known that one cougar and five coyotes were killed there this winter. The chief forage for this unit consists of the following: grass, willow, ceanothus, mountain maple, alder, juniper, serviceberry, dog wood, and chokecherry.

Deer migration started on November 5th following a heavy snow and one week later most of them had moved to their winter range. The elk started to migrate at the same time, but by a lesser degree. Hunting pressure no doubt had its effect on migration too. Within the area there are ten ranches and sheep come in from out of state for summer grazing on this winter game range.

About one/sixth of this unit has been logged. No logging is being carried on at present, but logging roads have been built into some of the un-cut portions. It is believed operations will start again soon.

Access into this sub-unit is difficult, but in spite of the fact about 300 men, mostly local sportsmen take 25 elk, 75 white-tail and 25 mule deer annually. Predator kill of deer this winter was estimated at

40. The browse shows very heavy use in past years. It is believed that in more severe winters most of the deer will be found in the three areas of concentration.

RECOMMENDATIONS

It is recommended that deer season be restricted to bucks only as a satisfactory sex ratio exists, and that elk of either sex be taken during the regular season. Removal of domestic stock in the Sheep Flats area is recommended as present indications show it not capable of this dual use.

BIG GAME POPULATION TABULATION

Species	: Actual : Count	: Estimate	: Total	: Carrying : Capacity
White-tail Deer	: 375	: 224	: 599	: 400
Mule Deer	: 198	: 235	: 433	: 500
Elk	: 63	: 48	: 111	: 175

SUB-UNIT NO. 2

ELK CREEK - BEAR CREEK

GENERAL DESCRIPTION

Elk Creek, Ashby, Arkansas and Bear Creek make up this unit. Elk Creek enters the Blackfoot Valley floor one mile east of the Greenough Post Office. No heavy concentrations of game were found in this sub-unit and dominant species were elk and mule deer. On the southwest slopes, primary game food species are grass and ceanothus.

A major portion of this winter range was logged in the 1920's and forest fire went over most of it in 1929. The browse in the bottoms consist of the following: dog wood, willow, mountain maple, alder, serviceberry and chokecherry.

On November 5th and 6th mule deer were seen migrating to Little Fish Creek and lower Elk Creek. On November 14th and 15th elk were killed on Little Fish Creek and none were seen down that low before that date. On Ashby and Arkansas Creek about 15 elk and 30 deer were taken by legal hunting.

There are two large ranches adjacent to this area. In the winter of 1942-43 this was a problem area as ranchers complained of elk trespass. Elk proof hay corrals have been in place at the outlying stacks for three years and apparently have been effective. Elk were found near by, but none came on the meadows this winter. Access into the more primitive portions of this area is most difficult and the hunter-take during the first part of the season was negligible and light during the latter part.

No change in hunting season is recommended. Winter range in this area will handle twice or three times the game we found there.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	—	—	—	—
Mule Deer	47	23	70	200
Elk	36	64	100	125

SUB-UNIT NO. 3

CLEARWATER-SPERRY GRADE

GENERAL DESCRIPTION

This area starts at the junction of the Big Blackfoot and Clearwater Rivers. It takes in the River bottom from here to the mouth of Cottonwood Creek, the southwest slopes of Sperry Grade and the low rolling hills north of the Cahoon Ranch. White-tail deer were found over the entire wintering area, but not so many were found on the higher southwest slopes of Sperry Grade. Mule deer and elk were only found on the southwest slope of Sperry Grade.

The chief forage in this unit is ceanothus, grass, serviceberry, chokecherry, juniper and fir needles. The Douglas fir and juniper show a distinct deer line in certain districts. The deer started concentrating in this area about November 7th.

This sub-unit is very accessible and quite heavily hunted. About 150 hunters took 40 deer here, the heaviest take was in the latter part of the season. This is a small area and will not support more game especially in the more severe winters.

Big Game Population Tabulation

Species	: Actual : Count	: Estimate	: Total	: Carrying : Capacity
White-tail Deer	: 242	: 58	: 300	: 300
Mule Deer	: 147	: 53	: 200	: 200
Elk	: 3	: 12	: 15	: 25

SUB-UNIT NO. 4

SALMON LAKE HILLS, OWL CREEK, FISH LAKE AND DREW CREEK

GENERAL DESCRIPTION

This is the most critical wintering area in the Swan-Blackfoot Unit. Along Salmon Lake to the north and to the east in the lower slopes are found white-tail deer while in the higher elevations mule deer and elk are common. In Drew Creek elk occur while in the Fish Lake area mule deer and elk wintered in near proximity. Along Owl Creek only white-tail deer were found at lower levels, but a few elk wintered near the top of the drainage. No deer were found from the headwaters of the Clearwater to a point one mile north of Salmon Lake after the first of December.

By the first week in April, as higher country opens up, the deer leave the critical winter range. All indicators on this range point to extreme over-utilization. Grass is practically absent, mullein stalk have been stripped and the dominant vegetation consists of low palatability foods; such as, Oregon grape, and kinnikinnick.

Soil erosion has been noted and the grass is almost gone, in places only the roots remain.

LIVESTOCK USAGE

This very critical white-tail wintering grounds is grazed all summer by sheep, from a ranch near Deer Lodge. Some locally owned cattle and horses also summer on the unit and 12 head of horses wintered with the deer.

About 2/3 of this area has been logged in recent years. Because the soil is so porous and the cover thin, this area tends to dry-out early and

annual growth is not great.

Access into the area is easy, about 400 hunters take 90 deer and 10 elk annually. It is estimated that 70 deer are killed each winter in this area by predators, cars and poachers. Very few were taken by poachers this winter.

No change in hunting season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	376	204	580	400
Mule deer	285	65	350	300
Elk	73	65	138	165

SUB-UNIT NO. 5

COTTONWOOD CREEK-BOYD RANCH

GENERAL DESCRIPTION

Cottonwood Creek and its tributaries on the east and the east slope of Boyds Hill make up this sub-unit, which is perhaps the key to elk management in the entire Swan-Blackfoot district.

Boyds Hill forms a peninsula upon which elk from the Cottonwood winter. As the country surrounding the hill is hayland a problem is created by elk use of haystacks.

About three-fifths of the unit is cut-over land. Fir thickets and brushy swamps untouched by loggers still remain, affording excellent cover.

Willow, dog wood, chokecherry, quaking aspen, alder, hawthorn and grasses form the primary vegetative cover.

Nine ranches are located in this sub-unit and two of these are large. The Boyd Ranch had over 70 large haystacks last year and these stacks have attracted elk, causing rancher complaint and a special season. Browse in the area is good and could support the elk wintering there if it were used.

An attempt to control elk on the Boyd Ranch was made in December. Thirty permits were issued, with the hope that additional hunting would chase the elk out of the area. Only 19 permits were filled and the objectives were not realized.

RECOMMENDATIONS

It is believed that a cooperative project could be established which would aid in maintaining elk in the area with a minimum of disturbance. This recommendation, which is discussed in more detail at the end of this report, consists of land acquisition, fencing of certain haystacks and managed hunting.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	---	---	---	---
Mule Deer	---	---	---	---
Elk	76	24	100	100

SUB-UNIT NO. 6

MONTURE-McCABE CREEK

GENERAL DESCRIPTION

This area includes Monture Creek north of the Ranger Station, and the area south and west of the Ranger Station to the headwaters of the tributaries of Cottonwood Creek and includes area on the north side of McCabe Creek. Monture, Dunham and McCabe Creeks have very dense cover in the flats below the Ranger Station. Douglas fir covers a major part of this wintering area. White-tail deer were found throughout the brushy bottoms. Some elk were found here too, others wintered up McCabe Creek in 20 inches of snow and 8 elk wintered up Monture Creek on a west slope in four feet of snow. These elk have spent the winter in a very small area, cleaning up one patch of browse before breaking a trail to the next.

Plenty of good forage can be found at lower levels. The chief browse species for this unit are: serviceberry, willow, chokecherry, dog wood, ceanothus and grass.

A small portion of this unit has been logged and more will be logged soon.

A migration of deer into the lower country was noted starting November 5th. Elk came down about the same time, but hunting pressure forced them back. A large number of mule deer summer in the higher country in this area, but winter in sub-unit No. 10 on Monture Hill. It is during the migration through sub-unit No. 6 that the most deer are taken.

About 300 hunters take 40 elk and 50 deer annually during the regular hunting season.

No change of season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	31	84	115	200
Mule Deer	--	--	--	--
Elk	55	120	175	200

SUB-UNIT NO. 7

DICK CREEK-WARREN CREEK-OVANDO MOUNTAIN

GENERAL DESCRIPTION

This area includes the lower edge of Ovando Mountain from the south side of McCabe Creek to the north fork of the Blackfoot River taking in Upper Dick Creek, Warren Creek and Spring Creek. Most of the Ovando Mountain wintering area is an old burn. The remainder of the area is flat country with low, rolling hills having a cover of Douglas fir and pine. Many brushy swamps are also found.

Nine ranches are within the area. Most of them have fenced the elk out of their hay corrals. Two of them still complain of slight damage, but have some of their stacks elk proof.

The forage in this sub-unit consists of the following: mountain maple, chokecherry, serviceberry, hawthorn, willow, dog wood and grass.

The white-tail winter throughout the brushy bottoms, the mule deer winter in the rolling sagebrush hills next to the Dry Gulch road. Elk usually range along Ovando Mountain, but a few stay down adjacent to the ranches.

Access into the unit is easy. One hundred and fifty hunters take 15 elk and 30 deer annually. The bucks stay in dense thickets, otherwise, the kill would be much greater. No change of season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	18	125	143	200
Mule Deer	36	14	50	125
Elk	14	83	97	100

This unit as a whole could support lots more game, but along the edge of Ovando Mountain where the elk winter, a heavy browse use was noted.

SUB-UNIT NO. 8

COOPERS LAKE-MARKHAM MOUNTAIN

General Description

This country takes a Mineral Hill, Markham Mountain and a narrow strip on the ridge to the north and the Coopers Lake area. The south slopes of Mineral and Markham have sparsely scattered timber and browse, the ground cover being mostly cheatgrass. The remainder of the area is of the Douglas fir type with a few patches of yellow pine. A concentration of deer was found on the south slopes of Markham Mountain and Mineral Hill. This area is grazed by domestic stock in summer. A few deer were found on the west slope of the ridge north of the Markham area. None were found near Coopers Lake except the remains of five killed by Cougars.

Three cougars were taken in the Coopers Lake vicinity the day following field investigations.

Elk were found north and east of Coopers Lake and a few well back on Markham. The chief winter forage consists of the following: green cheatgrass, small patches of bunchgrass, ceanothus, mountain maple, serviceberry, chokecherry and juniper. The juniper shows a very distinct deer line. The north portion of this unit has a far better browse. It is suitable for elk, but has too much snow for winter deer range.

Hunter kill is light.

There are six ranches adjacent to the area, one of these ranchers has complained of elk damage. He had only two stacks.

No change in hunting season is recommended. It is recommended that the Fish and Game acquire the Markham Mountain area and restrict livestock grazing.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	117	33	150	150
Mule Deer	73	39	112	112
Elk	9	24	33	50

SUB-UNIT NO. 9

LINCOLN CANYON

GENERAL DESCRIPTION

This area covers a narrow strip along the River from Markham Mountain to Lincoln. Deer, although not yarded, were found limited to this narrow area which is about 12 miles long and will average one-quarter of a mile in width. About one third of the deer were found between the road and the river in the dog wood and willow patches. The rest were above the road where juniper is the key browse. Other forage is as follows: chokecherry, serviceberry, nannyberry, mountain maple, honeysuckle and grass. Juniper and fir show a decided deer line.

Three ranches are within the area. Domestic stock graze here in summer and 20 horses grazed on this range all winter. The deer in this area summer in Upper Arrastra Creek, Lincoln Gulch and Beaver Creek.

About 150 hunters take 40 deer annually in this area. Access into the area after the snow comes is very difficult. No plows are used and some of the hills are very steep. It is believed that by acquiring land around the Markham Hill area, it would relieve the wintering pressure here as the areas are closely associated.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	92	100	192	200
Mule Deer	1	—	1	—
Elk	—	7	7	—

SUB-UNIT NO. 10

MONTURE HILL-BLACKFOOT RIVER BREAKS

This takes in the country along the River from the mouth of Monture Creek to the mouth of Frazier Creek, and all of the Monture Hill. The area is primarily mule deer winter range and is entirely on private property. The main forage is bunchgrass, with small amounts of juniper, willow, dog wood, quaking aspen, serviceberry and chokecherry. These deer are competing with about 200 head of horses on this range, but have done so for years. The range does not appear to be over-grazed. No domestic stock summer here. These deer summer in the high hills north of Monture Ranger Station and are usually off winter range by April. Some go into Chamberlain Creek.

Very few deer are harvested on this unit because they are found on the unit only during the winter, but a number of them are taken when passing through sub-unit No. 6.

No change in hunting season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	17	8	25	40
Mule Deer	228	72	300	300
Elk	—	—	—	—

SUB-UNIT NO. 11

PEARSON CREEK-CHAMBERLAIN CREEK

GENERAL DESCRIPTION

Included in this area are the Pearson, Chamberlain and Bear Creek drainages and Blacktail Mountain, also the adjacent area south of the Blackfoot River. Mule deer were found on the southwest slopes of Granite Mountain which was being logged, on the south slope of Blacktail Mountain and a few which the lumberjacks fed all winter at Camp Number Eight. The elk in the area were found at the head of the West Fork of Chamberlain Creek. The white-tail were found along the Big Blackfoot on the south side. Of the band of deer being fed hay all winter, the fawns looked poor, their coats were patchy and as a whole didn't look as good as those not fed.

The forage in the area consists of the following: dog wood, willow, serviceberry, chokecherry, alder, ceanothus, mountain maple, bunchgrass and the moss on the trees felled. This game herd nearly all migrates from the high country on the north side of the Garnet Range. About 175 hunters took 10 elk and 20 deer here last fall. Access into the unit is much easier at present than it has been as trucks are hauling the logs. Because of the snow depth and due to the fact that there is very little south slope, it is felt that the area in more severe winters couldn't support many more deer, but could handle twice or three times the amount of elk that are now there as they could cope with the snow better.

No changes in season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	26	60	86	100
Mule Deer	96	44	140	145
Elk	27	7	34	75

SUB-UNIT NO. 12

SHEEP MOUNTAIN-McNAMARA LANDING-GREENOUGH DIVIDE

This area runs from Sheep Mountain to the Highway and from Bonner to McNamara Landing and the hills north of the Highway from the Greenough Divide to McNamara Landing. White-tail were found along the River from Johnson Gulch to Gold Creek with mule deer and elk higher up. Only mule deer were found from McNamara Landing to the Greenough Divide north of Potomac. The forage for the unit consists of the following: bunchgrass, ceanothus, willow, alder, quaking aspen, hawthorn, mountain maple, choke-cherry, serviceberry and dog wood.

There are a number of ranches adjacent to this area. Most of this sub-unit is grazed in summer by domestic livestock and horses were on it until the last of March when it became necessary to get them in and feed them. Deer were doing nicely. One hundred hunters take 25 deer and 5 elk annually.

No change in hunting season is recommended.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	54	50	104	150
Mule Deer	50	125	175	250
Elk	—	25	25	50

CONCLUSIONS

The Swan-Blackfoot Big Game Unit is an important area to western Montana hunters. Although big game populations, particularly elk are not large, a substantial amount of hunting is provided the sportsmen of Missoula County and adjacent areas.

Estimates of hunter demand have been prepared by contacting local residents in each area and while these are not accurate trends are indicated. It is estimated that about 1800 hunter days are spent in this Unit. The hunter-harvest of white-tail amounts to about 15% of the total population, 10% of the mule deer are taken annually and 17% of the elk. This would indicate that hunters are actually taking the annual increase of white-tail deer and elk and that these two species are remaining about static. Mule deer should show an increase with only 10% of the herd harvested. Population estimates substantiate these figures.

An examination of land ownership in the area indicates clearly the key problem relative to the maintenance of big game in the Swan-Blackfoot Unit. While over 2,000 square miles of this unit are available as summer

range only 10% can be used by game during the critical winter period. Of the 10% winter range about 8% is on private land. Much of this land is over-grazed by domestic stock prior to the winter use by game.

Sex ratios of all species have been found satisfactory and the percent of young animals also indicate a satisfactory herd balance.

RECOMMENDATIONS

It is apparent that the key to maintaining an optimum of big game in the Swan-Blackfoot Unit depends upon managing these animals in such a way that good winter range is provided and encroachment on livestock interests is reduced.

This can be done by working with all interested groups and individuals in this area and the following suggested management plans:

1. Urge formation of a Swan-Blackfoot Conservation Committee.
2. Through the committee acquire certain marginal lands and develop these to the maximum for big game wintering.
3. In cooperation with certain key ranches and with direct contributions from these ranches and local sportsmen, construct elk proof fences on outlying haystacks, work out an agreement with the rancher to feed from certain stacks first, combine stack-yards and do everything possible to reduce the availability of hay to game.
4. Encourage use of winter game range by closure to hunting for a few years and by extended season on adjacent ranch land.

Submitted by:
Frank Gummer, Fieldman
R. H. Evers, Fieldman
Wildlife Restoration Division

May 6, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

SWAN-BLACKFOOT UNIT

GARNET RANGE-ROCK CREEK BIG GAME WINTER SURVEY

1947 - 1948

Montana Fish and Game Department
Wildlife Restoration Division

Submitted by:
Frank Gummer, Fieldman
R. H. Evers, Fieldman
Wildlife Restoration Division

May 5, 1948

TABLE OF CONTENTS

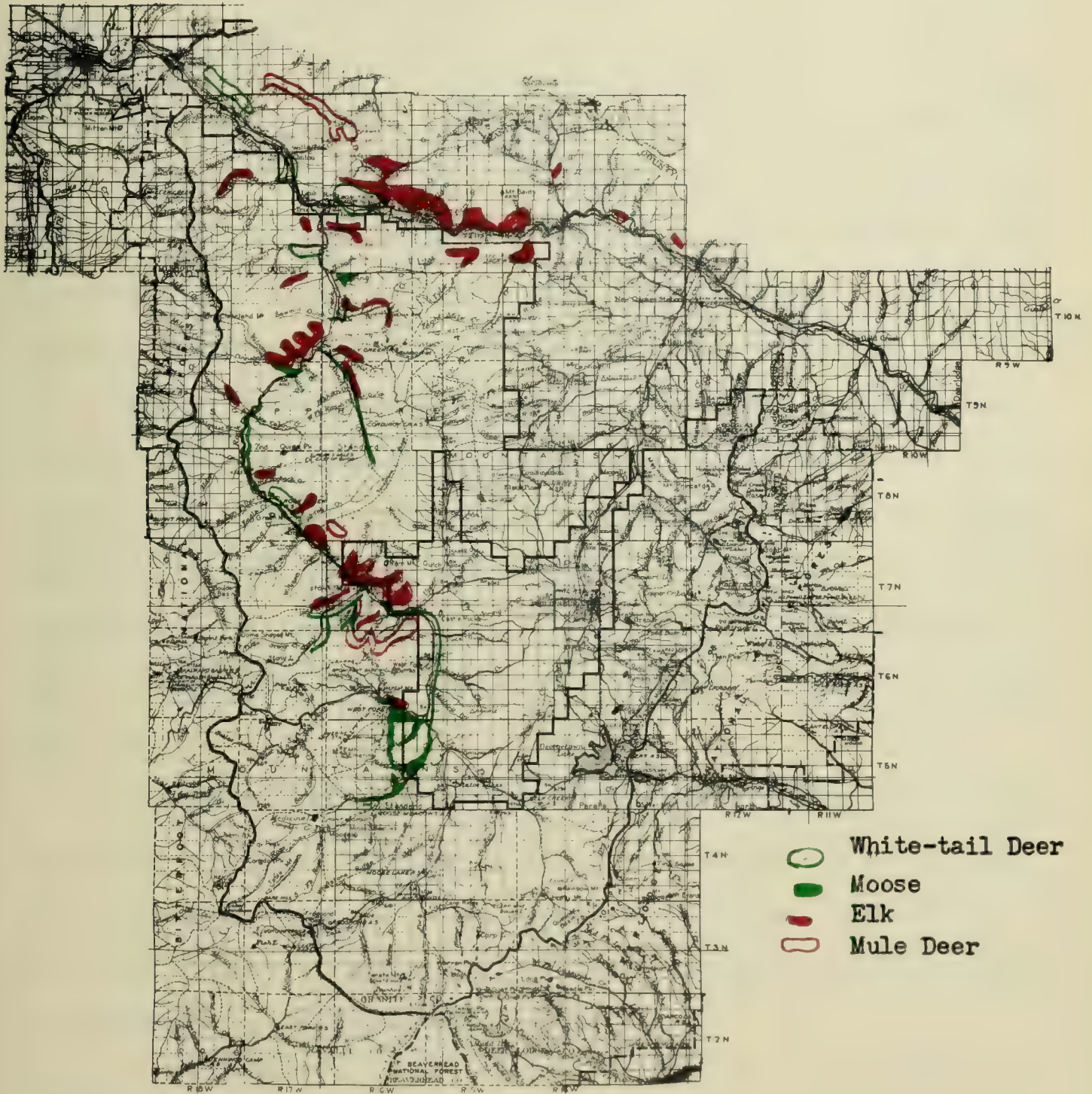
	<u>Page</u>
Introduction.	93
Personnel.	93
Physical Features	94
Census Technique and Observational Methods.	96
Unit Summary of Big Game in Rock Creek and Garnet Range	96
Big Game Population Tabulation	
White-tail Deer.	97
Mule Deer.	97
Elk.	98
Moose	98
Mountain Sheep.	98
Sub-Unit No. 1 (Lower Rock Creek-Harvey-Tyler and Schwartz)	
General Description	100
Land-Use Economy.	100
Cattle Owned and Grazed on Forest Land.	102
Outside Cattle Grazed on Forest Land.	103
Wildlife Observations.	103
Hunting Pressure.	104
Deer Sex Ratio.	105
Big Game Population Tabulation.	106
Recommendations	106
Summary for Lower Rock Creek.	106
Sub-Unit No. 2 (Upper Rock Creek)	
General Description.	107
Historical Data.	108
Game Movements.	109
Economy of Unit	110
Big Game Population Tabulation.	110
Recommendations	111
Sub-Unit No. 3 (Garnet Range)	
General Description	111
Land-Use Economy.	112
Historical Data	112
Wildlife Observations	113
Big Game Population Tabulation.	113
Summary of Sex Ratio and Percent of Young	114
Recommendation.	115
Conclusions.	115

(continued)

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Recommendations.	115
Map	
Showing Units and Game Range	92
Picture	
Mule Deer Buck.	99

Garnet Range-Rock Creek Winter Game Survey



GARNET RANGE-ROCK CREEK BIG GAME WINTER SURVEY

1947 - 1948

INTRODUCTION

As part of the overall big game management program prepared by the Montana Fish and Game Department, management units have been designated throughout the big game ranges of the State. As time and personnel have permitted, these units have been studied in detail and management plans prepared to assure optimum conditions for wildlife.

The Garnet Range-Rock Creek units have not been covered in their entirety prior to 1947-48 for various reasons. Deer range on the south slopes of the Garnet Range is almost entirely on private land and game in Rock Creek, although varied, has never been found in sufficient number to constitute a wildlife problem. U. S. Forest Service game studies have been made on Forest lands within the units and reference is made to these in this report.

Because of changing conditions within this area, terrific increase in hunting pressure, damage complaints by ranchers in some sections and the general program of completing surveys in all units, it was found desirable to study big game in this district during 1947-1948. Accordingly, a two-man crew was assigned to the area.

PERSONNEL

Frank Gummer and R. H. Evers started work in the unit on November 24, 1947 and returned from the last field trip April 6, 1948. During this period, 78 man-days were spent in the field covering the major part of the

winter range. The use of a jeep greatly helped in covering country where roads are generally not open to motor travel in winter and saved many time-consuming miles of snowshoe travel.

Means of Travel	Nov.	Dec.	Jan.	Feb.	Mar.	April	Total
Car	74	578	562	300	437	87	2,038
Snowshoe-Foot	23	49	118	22	74	26	312

PHYSICAL FEATURES

This unit comprises approximately 566 square miles. However, only about 96 square miles are usable by game during the critical winter period. This is approximately six percent.

The topography of the Rock Creek section ranges from rolling foothills, sagebrush and grasslands, large willow bottoms in the Upper Rock Creek country to a narrow, rocky canyon at the mouth where Rock Creek empties into the Clark Fork of the Columbia.

Rock Creek heads on the Continental Divide and runs in a northerly direction to its junction with Clark Fork near Clinton, Montana, a distance of approximately 70 miles. Its principal tributaries are the four big forks at its head, which are, East Fork, Middle Fork, Ross Fork and West Fork. The larger creeks flowing in from the west are: Stony, Wyman, Welcome and Gilbert Creeks. From the east are: Willow, Hogback, Butte Cabin, Ranch, Brewster and Spring Creeks.

The major timber type on the south slope is yellow pine and the major browse on these open slopes are mountain maple, serviceberry, mountain balm, juniper and chokecherry. On the north slope fir-larch type

predominates and the browse is alder, dog wood, tall huckleberry and willow.

The economy of the area is centered around cattle raising and is limited by the amount of summer range available and the hay that can be put up for winter use. Probably recreation is one of the most important values to be considered in this drainage.

Elk and moose have damaged some hay in the past winter in Rock Creek. There is an abundance of winter range and good browse in this area suitable for this game, but they have become accustomed to foraging in hay corrals at night during the severe part of the winter. These ranches where the damage has occurred are in the desirable locations where game would normally congregate at this time of year.

There are no white-tail deer in the Upper Rock Creek drainage. The grassy, south slopes cut with timbered draws and timbered browse covered north slopes are ideal mule deer range. Mule deer are no problem in this area and except for limited areas, no sign of over-grazing is evident. There is very little indication of browsing in fir and juniper and these species show no "deer-line".

The winter of 1947-48 may be considered an average winter on game. Snow depths averaged 3.2 inches on south slopes, six inches on level and 13.6 on north facing slopes. Crusted and icy conditions, which started about November 5th, made foraging difficult during most of the winter. Snow had disappeared over most of the winter range in April. Temperatures during the first week in March dropped to 22° below zero at Schmidt's Ranch on Rock Creek, this was the coldest period of this season.

Garnet Range division of this unit starts at Bonner, Montana, and

runs in an easterly direction to Drummond, Montana, a distance of about 40 miles. The altitude varies from approximately 3,100 feet at Bonner, Montana, to 6,930 on Mount Baldy in the Bearmouth area.

This area parallels Highway #10 and the Clark Fork of the Columbia River, the entire length. There are fair roads leading into the mountains on the main creeks and most of the area is easily accessible to hunters. The terrain ranges from steep rocky slopes near Bonner to rolling sagebrush hills in the Drummond area.

The main drainages running into the Clark Fork River from Bonner to Drummond are: Turah Creek, Kendall Creek, Donovan Creek, Wallace Creek, Cramer Creek, Little Bear Creek, Bear Creek, Murkey Gulch and Rattler Gulch.

CENSUS TECHNIQUE AND OBSERVATIONAL METHODS

Census methods used in this survey depends upon extensive coverage of all wintering areas. Travel was designed to cut through the representative range and to count as much game as possible. Fresh tracks were used as indication of additional game and estimates were determined from this information. During the early part of the year, efforts were concentrated on getting data on sex ratios. After shedding of antlers by white-tail deer was started on the 17th of December emphasis was placed on getting total population data.

UNIT SUMMARY OF BIG GAME IN ROCK CREEK AND GARNET RANGE

Rock Creek-Garnet Range unit has been divided into three sub-units for convenience in study and reporting. These are shown on the map at the beginning of this report. The tabulation on the following page shows a summary of the three sub-units.

The estimates here are very conservative and were made each day for the area covered that day. The carrying capacity of range was arrived at by observation each day and the condition of available range near-by that was not put to use.

BIG GAME POPULATION TABULATION

White-tail Deer:

Area	Actual Count	Estimate	Total	Carrying Capacity
Lower Rock Creek	33	161	194	300
Upper Rock Creek	--	--	--	--
Garnet Range	228	183	411	500
Totals	261	344	605	800

Mule Deer:

Area	Actual Count	Estimate	Total	Carrying Capacity
Lower Rock Creek	214	430	644	800
Upper Rock Creek	331	149	480	1,200
Garnet Range	697	430	1,127	1,500
Totals	1,242	1,009	2,251	3,500

Elk:

Area	Actual Count	Estimate	Total	Carrying Capacity
Lower Rock Creek	2	13	15	25
Upper Rock Creek	74	10	84	150
Garnet Range	—	36	36	150
Totals	76	59	135	325

Moose:

Area	Actual Count	Estimate	Total	Carrying Capacity
Lower Rock Creek	9	13	22	25
Upper Rock Creek	22	32	54	100
Garnet Range	—	—	—	—
Totals	31	45	76	125

Sheep:

Area	Actual Count	Estimate	Total	Carrying Capacity
Lower Rock Creek	—	—	—	—
Upper Rock Creek	15	2	17	150
Garnet Range	—	—	—	—
Totals	15	2	17	150

Only one mountain goat was actually counted and it was seen in the Upper Rock Creek area.



Mule Deer Buck. Of the two species of deer in the unit, the mule deer is most common, being about four times more abundant than the white-tail Deer.

SUB-UNIT NO. 1

LOWER ROCK CREEK-HARVEY-TYLER AND SCHWARTZ

GENERAL DESCRIPTION

Included in this area is Tyler Creek, Harvey Creek and Schwartz Creek and from the mouth of Rock Creek south to the Forest boundary. All of this area lies south of the Clark Fork River and drains into this River.

The area is primarily mule deer range with a small number of white-tail deer, elk, moose and mountain sheep. The elk are natives of the adjoining Bitterroot Valley and range along the Divide between Rock Creek and the Bitterroot. Most of these elk return to the Bitterroot in the late fall when the snow gets deep in the high country.

The deer winter range is on the south slopes along Rock Creek and in small areas on the tributaries that have a south exposure. Chief wintering forage consist of native grasses and small browse. Service-berry, ceanothus, mountain maple, fir and juniper are dominant low cover species. Mule deer in this area spent a great deal of time in open grassy slopes where there was very little browse and were eating grass and grass-like plants.

White-tail deer were often found in the creek bottoms and hay-fields during the night and on timbered slopes during the day.

LAND USE ECONOMY

Within this area 15 ranches are found. There is one mining company operating at this time employing about six men and one logging outfit working in Schwartz Creek employing about six men.

There are approximately 1,600 acres of hayland in this sub-unit and 1,300 head of cattle range here during the summer months. Approximately one-half of these cattle are brought in from adjoining valleys. A small part of this summer range is the same range that the deer use during the winter.

Prior to 1919 this sub-unit had been heavily over-grazed by cattle and sheep and parts of the range were very much damaged. Since that time, cattle have been reduced from approximately 4,000 head to the present 1,350 head and sheep reduced from 6,000 head to no sheep at the present time. The range has made a good showing and is gradually coming back. There is very little conflict between cattle and game on this range as there is unlimited summer range for game and cattle are unable during the summer to use much of the game winter range on account of steepness and lack of water.

Game use only a small percent of cattle summer range during the winter as at this time snow is much too deep in the higher range.

CATTLE OWNED AND GRAZED IN LOWER ROCK CREEK ON FOREST LAND

IN 1947

Name	Horses	Cattle	Acreage
Louis Corra	--	50	90
Carl Welsh	--	10	60
Ray Handley	5	20	120
C. Hamm	2	47	370
Mrs. Andrews	--	10	40
Wm. Byrnes	--	10	44
James Finlen	12	45	320
Swartz Brothers	--	36	160
Chris Hannen	--	50	175
Fred Spannuth	--	20	460
J. M. Gurnnane	10	45	400
Palmer Romness	--	15	60
M. S. Dexter	--	6	40
Harold Wyman	--	250	360
Albert Schmidt	3	15	90
Totals	32	629	2,789

OUTSIDE CATTLE GRAZED ON FOREST LANDS IN LOWER ROCK CREEK

IN 1947

Name	Cattle
Dooley Brothers	200
J. A. Conn	40
Mrs. Walter Hogan	100
Hans Kofed	280
Totals	620

There is one guest camp operated by Lloyd Luke at the mouth of Ranch Creek who has six cabins for rent and H. Norton, a rancher, has two cabins in this vicinity. These places are used mostly by fishermen.

There are two summer homes one mile up Brewster Creek and several more in this vicinity are being built at present. These places are on private ground.

There is one ranch on Gilbert Creek owned by James Finlen of Butte, Montana. This ranch is a combination cattle ranch and summer home. They run about 35 head of cattle on the Forest during the summer and during the hunting season a good number of hunters make this place their headquarters. At the present time it is believed that this place is not a commercial outfit, but may develop into a combination dude and cattle ranch in the near future.

WILDLIFE OBSERVATIONS

There is some migration of white-tail deer near the mouth of Rock Creek to the Garnet Range during the early winter and fall. The deer

that summer in the high country along Sandstone Ridge and Bitterroot Divide migrate to the lower level along Rock Creek and winter on the grassy south slopes.

During the winter 13 predator kills were found along the road and in the adjacent creek bottoms. As the breaks of Rock Creek are very steep, 70 to 75% slope, deer being run by coyotes lose footing in this steep ice-covered ground and roll into the road. Coyotes apparently make use of the topography in killing deer. Coyote tracks were numerous in all the winter range and cougar sign was seen in Upper Rock Creek. One old lion was killed in Tyler Creek during the last part of April by a hunter from the U. S. Fish and Wildlife Service.

HUNTING PRESSURE

Access to this sub-unit is easy. Rock Creek road leaving Highway #10, 5 miles east of Clinton, Montana, leads into this unit.

The Forest Service has nine improved camp grounds in the Rock Creek drainage where hunters may camp and the area is served by a graded road its entire length. Numerous side roads and trails make the hunting area accessible by car, horses and foot travel during the open season.

During the hunting season of 1938 the Forest Service kept records at two checking stations on Rock Creek, one at the mouth of the Creek and one at Stony Creek near the upper end of this unit.

This record shows 353 hunters taking out 61 mule deer and 7 white-tail bucks. Approximately one hunter out of five was successful.

It is believed that this is about an average year's take in the Lower Rock Creek sub-unit. It is likely there is a slightly larger kill

here as local residents were not included in this record.

A big kill is usual in this area during the latter part of the season. In 1946 and in 1948 heavy snow came in the first week of November, forcing the deer down into lower levels. Many deer were killed in the road and on the lower slopes adjacent.

In the early part of the season many hunters are very disappointed because game is so scarce, and complaints of too many does are common. However, most of these hunters do not get back far enough in a day's foot travel to get into the game country. The past early fall bucks were found to be rummaging in the high ridges at about 6,000 and 6,500 feet altitude and these ridges are from five to seven miles back from the roads.

DEER SEX RATIO

This study shows that there is one buck for each 3.3 does in this area among the mule deer and one buck to one doe* in white-tail deer.

The following table gives the actual count and estimate of game in Lower Rock Creek.

* It is felt that this ratio on white-tail deer is not a true picture as an actual count of only 59 head was made in the sub-unit and of these only 10 head were identified. It is suggested that sex ratio data for Garnet Range be used as white-tail deer migrate back and forth between these two areas.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total
White-tail Deer	59	161	220
Mule Deer	294	430	724
Elk	2	13	15
Moose	9	13	22

RECOMMENDATIONS:

It is recommended that deer hunting be restricted to bucks only in this area as the sex ratio is still well within the bounds of a good breeding ratio.

It is felt that with an average kill of about 70 deer and an average percent of young of 39.6 this herd will maintain itself and show an increase each year under the present hunting conditions.

Summary for Lower Rock Creek

Species	Male	Female	Young	Total	Sex Ratio	Percent of Young
Elk	2	--	--	--	--	--
Mule Deer	9	30	28	67	1 - 3.3	41.7
White-tail Deer	5	5	6	16	*1 - 1.0	37.5
Moose	4	3	1	8	1 - 0.7	1.3

*Data insufficient for accurate sex ratio, sex ratio in adjacent unit 1:3.6 is probably more nearly correct.

SUB-UNIT NO. 2

UPPER ROCK CREEK

GENERAL DESCRIPTION

Starting at the Continental Divide, this sub-unit consists of drainages forming the headwaters of Rock Creek. The East Fork, Middle Fork, Ross Fork, West Fork, Willow Creek and Stony Creek are primary drainages that flow through the unit.

The area is primarily mule deer range with a small number of elk, moose and sheep.

The mule deer winter on the south slopes of Stony Creek, Willow Creek, West Fork and main Rock Creek from Big Horn Creek to Willow Creek. Elk range along main Rock Creek on the west side from Stony Creek to the mouth of West Fork.

Chief winter forage consist of native grasses, mountain maple, serviceberry, alder, dog wood and willow.

Some damage complaints against elk occur in Upper Rock Creek. There is a great abundance of mule deer and elk range here with a normal snowfall of 12 to 30 inches, these species should be able to forage successful in this area. The south slopes were at least partly bare most of the past winter. About 12 inches of snow on the level and an average of 30 inches in the heads of the creeks.

The moose winter along the creek bottoms and up the side drainages almost to the divide. Tracks indicated that they had been working down the creeks from the high country since the snow first came in November. There is a great abundance of browse in the bottoms. Willow, dog wood, quaking aspen and even alder are most used by moose. The largest number

of moose seen together were two. Most animals seen were alone.

HISTORICAL DATA

There is evidence of a great many sheep in the whole sub-unit in early days. There are men still living on the upper Creek who remember as many as 50 to 75 mountain sheep in the range where 15 were found at this time. As late as 1917 mountain sheep were numerous as far down the creek as Little Hogback. Numerous mountain sheep skulls have been found in this area in the last three years. Sheep skulls have been nailed up years ago on old log buildings in Gilbert Creek and Spring Creek near the mouth of Rock Creek indicating that bighorns once used this area.

Buffalo once ranged in the Upper Rock Creek area and there is evidence that they had been down the creek as far as Little Hogback where the canyon starts to narrow down. Many skulls and bones have been picked up on the flats at the mouth of big and Little Hogback Creeks. It is thought that these buffalo were snowed in here and winter killed.

Mountain sheep range on the east side of Rock Creek from Sheep Gulch to the mouth of Willow Creek. This is primarily southwest slope and very steep for about 1,000 feet and then levels off into gentle grassy slopes with native grasses and small browse. There is very little browse available on these slopes except sagebrush, juniper and fir. It was determined that grass was the primary food being eaten by this band of sheep at the time of observation. Sheep were found to stay in the steep ground between the creek and the grassy slopes. They spent a great deal of time lying down and when grazing were constantly digging at their heads and front quarters with their hind feet indicating external parasites.

Mountain sheep range from Sheep Gulch to the mouth of Willow Creek during the winter and information secured from local residents indicate they range back on Sandstone Ridge to the head of Hogback Creek during the summer.

Up to about 30 years ago these sheep ranged down Rock Creek as far as Little Hogback Creek, but there was no sign of sheep the past winter below Anderson's Ranch near the mouth of Sheep Gulch.

Mule deer were using practically the same range in this area.

Elk were found wintering on the west side of Rock Creek from Stony Creek to the Gillis Ranch near the mouth of Willow Creek. An extended bull elk season was held in this area last year in an effort to reduce rancher complaint of damage. This special hunt did not act as effectively as originally hoped. Some use of haystacks occurred as late as April 5th, and several bulls shed their horns in the hay corrals during the last week of March.

Moose gave some trouble in the West Fork of Rock Creek in the area around Sapphire mines. Most of the trouble here was caused by about 12 moose. Fencing with camouflage wire was tried but was unsuccessful. This area is an ideal moose winter range with large creek bottoms of willow, alder and dog wood browse. Snow depth in these bottoms averaged 16.8 inches in the last half of February. With no more snow than this, moose have no difficulty getting around.

GAME MOVEMENTS:

Deer and elk migrate from the Bitterroot Divide and Sandstone Ridge summer range during the early part of November and were still on the winter range on April 6th. As the snow goes off they follow the snow-line back

as the new grass and browse comes out.

Mule deer and elk are seldom seen in this wintering area during the summer months and deer are very scarce during the early part of the hunting season.

ECONOMY OF UNIT

The industry of the area centers around ranching and cattle raising. There are no figures available on the number of cattle grazed or the amount of hayland cultivated. As far as is known there are no combination dude ranches and cattle ranches.

This area is very accessible from Philipsburg, Montana, by a good graded and graveled road as far as Gillis Bridge. From here on the road is in fair condition during the hunting season. There is a fair road up Stony Creek about six miles and several trails leading up to the high country from this road.

It is estimated that 250 hunters take out 40 deer and 25 elk in this area annually.

The following table gives the actual count and estimates for this sub-unit.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total
White-tail Deer	—	—	—
Mule Deer	331	149	480
Elk	74	10	84
Moose	22	32	54
Mountain sheep	15	2	17

RECOMMENDATIONS

1. It is recommended that hunting season dates be October 15th to November 15th and bucks only should be taken.
2. The season should remain closed on moose except by special permit.
3. Elk of either sex should be taken during the regular hunting season.
It is believed that either sex hunting might remove some of the elk that have been habitual haystack feeders.
4. Ranchers should be encouraged to construct elk proof fences.

Sex ratio data for mountain sheep are not available for this unit as unsatisfactory counts were made prior to shedding of antlers.

The goat seen was alone. He had drifted into the area near the mouth of Willow Creek about December 25th and had been seen by a local resident there almost every day for a period of over three months. He spent most of the time on a steep cliff facing the valley in plain sight from Gillis Ranch. Investigation proved that there were no more goats in the vicinity.

GARNET RANGE

SUB-UNIT NO. 3

GENERAL DESCRIPTION

Garnet Range runs in an east-west direction from Drummond to Bonner, Montana, a distance of about 40 miles and parallel to the Clark Fork River. The survey was made along the south slopes on critical wintering areas. All of this sub-unit lies north of the Clark Fork River and to the Divide between the Big Blackfoot and Clark Fork. The major creeks flowing into

the Clark Fork from the Garnet Range are: Bear Creek, Little Bear Creek, Cramer Creek, Wallace Creek, Donovan Creek, Kendall Creek and Turah Creek.

The timber type on south slopes is yellow pine, fir and main browse is serviceberry, chokecherry, maple, mountain balm and dog wood in creek bottoms. There is a great amount of grassland with sagebrush, juniper browse and sharp draws with small fir browse. Timber types on north slopes are fir-larch. Browse on north slopes is alder, maple and dog wood. These slopes get very little use during the winter on account of deep snow. The south exposed slopes were partly bare during most of the winter and the valley bottoms averaged six inches of crusted, icy snow in the wintering grounds.

LAND-USE ECONOMY

There are small dairy ranches and general farming along the Clark Fork adjacent to the Garnet Range and a number of ranches run cattle in the mountains of this area during the summer. However, there are no figures available on cattle for this part of the unit.

There is some conflict here between cattle and game.

HISTORICAL DATA

It is generally believed that deer have made a gradual increase in this unit during the last fifty years. Deer problems from over-stocking have occurred only in the last eight or ten years.

One resident, who has lived in this area for sixty years, claims that in the early 1900's game was very scarce and it required very diligent hunting to bag a deer of either sex. At present deer can be jumped within an hour's time almost any place in the unit.

WILDLIFE OBSERVATIONS

In the areas between Clinton and Ravenna, deer are concentrated in a narrow strip along the Highway and on the lower slopes of the mountains in bunches of 25 to 50 head or more. Many of these deer are killed each year on the Highway and Railroad.

It is known that six deer were killed during the past year and it is supposed that there were a great number more that were not seen.

White-tail deer and mule deer both use this area, but they range separately. The mule deer are usually up higher and are seen along the Highway less frequently.

As the snow goes off they move back into the higher country where the summer range is unlimited and give no trouble during this period. One ranch reports use of haystacks by deer.

Big Game Population Tabulation

Species	Actual Count	Estimate	Total	Carrying Capacity
White-tail Deer	228	183	411	500
Mule Deer	697	430	1,127	1,500
Elk	—	36	36	150

No elk were seen in this area, but tracks were found in every drainage where the survey reached the Divide into the Blackfoot valley.

The white-tail deer range between Clinton and Beavertail Hill is over-stocked and deer in this area are forced to use the fields and river bottoms to sustain themselves.

From Beavertail Hill to Bear Creek mule deer are found exclusively.

This is excellent mule deer winter range, but is over-stocked in spots. Grass and browse occur in abundance. In Little Bear Creek and Bear Creek there is no sign of a "deer line" on juniper and fir and the range is in good shape.

During past years this range was used heavily by sheep but no sheep have been in here for at least three years giving the range a chance to come back.

Mule deer in this area were in good shape and mature deer looked strong and smooth. Fawns were a little rough during the spring.

A white-tail doe was killed on the Highway near Bonita March 16th. This doe was in very good shape and had two well developed foetuses. A mule deer doe was killed by the Railroad April 7th. This deer was in good shape and also had two foetuses. In the latter case spots were apparent.

Summary of Sex Ratio and Percent of Young

Species	Male	Female	Young	Total	Sex Ratio	Percent of Young
Mule Deer	40	74	86	200	1-1.8	43
White-tail Deer	17	62	64	143	1-3.6	44

It is estimated that 250 hunters take about 50 mule deer, 25 white-tail deer and 15 elk in this area annually. The game range back near the Divide usually until late in the season and as the area affords excellent cover no big kill is made except on the first day. After being shot at they scatter out in the high country where hunters find it all but impossible to get to and return the same day. The migration ordinarily does not start until the heavy snows come late in the hunting season. This

year the white-tail deer were found to have concentrated on the winter range by December 20th, but at this time and until as late as January 19th mule deer were found in the back country at about 5,000 feet altitude.

RECOMMENDATION

No change is recommended in hunting seasons. Buck deer to be taken only.

CONCLUSIONS

As this was the first intensive study made in this unit it is impossible to make comparative estimates of game numbers to determine the population trend.

Mule deer, estimated to number 2,250, are the most common big game species. White-tail are next at about 600 and elk are relatively scarce numbering only 135.

Moose are becoming quite common in certain portions of the unit. The occurrence of one mountain goat is considered an oddity and mountain sheep are probably barely remaining static.

The three primary species of big game have a satisfactory sex ratio and as indicated by the percentage of young animals, the herds have a good potential of increase.

RECOMMENDATIONS

There are no indications that a change from the "buck law" is desirable in this unit. Easy accessibility and nearness to centers of heavy population make it necessary to provide extra protection to the breeding herd of deer.

Salt placement on high ridges may be desirable particularly on the

Garnet Range. This region not being on National Forest land has not been salted previously.

It is doubtful if a large herd of elk could be maintained in the unit without rancher complaint, it is therefore recommended, that the hunting season remain as in 1947.

Moose population is fair and will probably support a limited hunt on mature bulls. Ten permits should be issued for 1948 and a careful aerial survey made in 1948-1949 during the winter to determine the number of moose in upper Rock Creek.

This area is also suggested as a moose trapping site, particularly on the ranches where moose damage has occurred.

It is doubtful if much can be done to increase the small band of mountain sheep, but a 10-80 station on the upper grassy portion of the range might reduce predation. A big game closed area on the sheep range might serve as additional protection. A yearly re-check of these mountain sheep should be made.

Submitted by:
Frank Gummer, Fieldman
R. H. Evers, Fieldman
Wildlife Restoration Division

May 5, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

ABSAROKA UNIT

NORTHERN YELLOWSTONE ELK HERD COOPERATIVE COUNT

DATE:

February 17-20, 1948

PERSONNEL:

National Park Service, Forest Service, State Fish and Game Department, Absaroka Conservation Committee and local sportsmen and ranchers.

PURPOSE:

It was desired to get as accurate a count on this elk herd as possible in order to better determine the proper number to be harvested this coming year. These dates were chosen by the Park Service men because elk distribution and weather conditions seemed to indicate this to be the most opportune time.

PROCEDURE:

A meeting of all participants was held on the evening of February 16th, at Mammoth to determine methods of coverage and responsibility of counters. It was decided that the Park Service personnel would cover the area within the Park boundaries and Forest Service men that area outside of

the Park. State men and others participated with both Agencies. One dude rancher and one wildlife student from the State College at Bozeman helped on the count.

The areas were divided into small, logical units and one man assigned to count each unit. Particular care was exercised to avoid duplication by recording numbers and direction of trend of all groups counted. Some men used skis, some snowshoes, some horses, but most of the lower areas could be covered afoot.

It was hoped to spend some flying time and catch some of the outlying areas that may have been missed by the crews, but extremely bad flying conditions prevented this.

The lower range outside the Park was covered in one day. The second day was quite stormy, so the men in the upper range in the Park had poor counting conditions.

FINDINGS:

The following table lists the elk seen by drainages in the area outside the Park. Only total figures for the Park area are available.

Area	Number
Deckard Flat	73
Bear Creek	59
Travertine	945
Trail Creek	279
Bassett Creek	445
Corwin Springs	213
	(Continued)

(Continued)

Area	Number
Cedar Creek	197
Slip and Slide Creek	69
Aldridge	39
Cinnabar Mountain	65
Mol Heron Creek	20
Cinnabar Basin	28
Yankee Jim (West Side)	0
Total for Outside Area	2,432
Total Park Area	5,383
Total	7,815

Other big game counted outside the Park are 442 mule deer, 113 antelope and 12 mountain sheep.

It is thought that this represents a reasonably accurate count of the Northern Yellowstone elk herd. Conditions were excellent for counting the first day and crews had little difficulty in seeing the elk early in the morning.

Winter range conditions were rather severe, but just prior to this census warm winds bared up many slopes and settled the snow. This may have caused some of the elk to be missed as they were beginning to seek higher pockets and timber thickets. This should not be a large factor because very deep snow conditions prevail a short distance up the mountains from the elk range.

Elk seen were in fine condition and very few dead were seen. They were probably wintering lower in the canyon than in former years, but the bulk of those outside the Park were in the Travertine area.

May 4, 1948

Submitted by:

Faye M. Couey, Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

BIG BELT - BOULDER UNIT

JIM BALL BASIN ELK SUMMER RANGE INVESTIGATIONS

DATE:

July 29-30, 1947

PERSONNEL:

Paul Roberts, A. D. Moir, Robert Jansson of the U. S. Forest Service; Robert Cooney, Faye Couey, of the State Fish and Game Department; Paul Hart, "Bat" Smith, Mr. Bowers, Mr. Lynn, ranchers, and Forest permittees in the area.

PURPOSE:

It was desired to check on the degree of use of this range by elk in summer. Several ranchers have registered some concern over fences being broken by elk and some have wondered how many elk can range here without competition with livestock.

PROCEDURE:

The above personnel met at the head of Trout Creek. Travel was then via saddle horse through Snedaker Basin, to Paul Hart's camp on Rock Creek, down Bowman Gulch, under Hogback Mountain to Smith ranch where Mr.

Smith was interviewed. The group then went on to Conway Ranger Station and stayed there over night.

The second day Jim Ball Basin was covered where considerable heavily used cattle range and some fine sheep range were inspected. Return was then back to Conway Station and then down White Tail Creek to the starting point.

FINDINGS:

Numerous groups of cattle were observed in Snedaker Basin where the range appears to be fully stocked. This is mostly Brown, Lynn and Hart cattle with a few belonging to Rankin.

These ranchers are not opposed to present numbers of elk here. Hart would like to see the open area extended to include this Basin which might discourage some of the elk from concentrating on this range and get a wider distribution. Saw two bull elk near his camp.

Under Hogback Mountain on Smith's range several quite heavily used areas were observed, particularly along water. Mr. Smith was seen and he was quite incensed about elk here during the summer. He says 15 to 20 cross his new pasture daily and they usually take the top wire with them when going over a fence. Although offering no corrective suggestions, he says that an early season will do no good because with the first snow which sometimes comes in September, the elk leave and there is no hunting this high. His attitude indicates he may be looking for some compensation for elk damage.

The trip through Jim Ball Basin showed varying degrees of stock use on the range. Most of the privately owned or leased lands here have been heavily over-used. The soil is rather loose and will not withstand

continued heavy use. The Forest range is in good shape here. An exceptional range recovery was observed on one piece of Forest land that a few years ago was in very poor condition, but which has come back phenomenally with protection.

The Elk Ridge sheep range appears in good shape. Elk are commonly reported seen in this area although none were seen on this trip.

Best estimates indicate that 100 to 150 elk range in the north end of the Big Belt Mountains and the area herein covered occupies part of their summer range. Probably the main concentrations are in Upper Hound Creek, Upper Elkhorn, Beaver and Rock Creeks. A rather small percentage of these elk range in the Jim Ball Basin area.

CONCLUSIONS:

1. Elk are not numerous in the area investigated. Two bulls and occasional tracks were seen. There is little competition with livestock.
2. Livestock range is stocked to capacity on Forest lands and some private lands indicate over-stocking.
3. Ranchers Hart and Smith are objecting to elk numbers on this range, Hart not very strongly, but Smith quite vociferously particularly because of broken fences caused by the 15 to 20 elk reported to be in Jim Ball Basin proper.

RECOMMENDATIONS:

1. No action is recommended following this investigation as it is felt that the numbers of elk present in this summer range is well below the carrying capacity.

No management practice could be suggested that would alleviate the local complaints which are not serious at present.

May 10, 1948

Submitted by:

Faye M. Couey, Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

CLARK FORK UNIT

INSPECTION OF THE CHERRY CREEK GAME PRESERVE

DATE:

April 23, 1948

The inspection trip was planned and arrangements for interested groups to be present were made by A. H. Cheney, Deputy Game Warden of Thompson Falls, when several sportsmen of the Local Rod and Gun Club suggested the Preserve be opened for elk hunting. Apparently the motive behind this proposal was to have a hunting ground for elk near Thompson Falls.

Making the inspection trip were: A. H. Cheney; Louis Rodenthall, U. S. Forest Service; Jack Doyle, Bob Saint, Neal Eplin, Sportsmen; Ade Zajanc and Merle Rognrud, Wildlife Restoration Division.

Travel up Cherry and Dry Creeks was made with a four wheel drive Army surplus Dodge weapons carrier. A two wheel driven vehicle could not negotiate the mountain roads at this season of the year. In the planning for more extensive work in Western Montana, transportation should include at least one Jeep permanently stationed in Missoula, and either a Jeep

or power wagon for use by the winter study crews.

Twenty six elk, 30 mule deer and seven white-tail deer were seen on the Game Preserve. One bull elk winter kill and two deer kills were found on Dry Creek.

The 1947-48 winter with a low snowfall was reflected by light to moderate use of the range from deer and elk. Apparently game was quite well distributed during the winter, so over-browsing was not noted and probably did not occur on any large section of the Preserve.

The group making the inspection was impressed by the amount of available browse and agreed the Preserve was still serving its purpose and should remain closed to hunting unless over-utilization by big game would be found by subsequent yearly inspections. It is believed elk are increasing and moving to ranges adjacent to the Preserve.

A severe winter may result in heavy browse utilization by deer, but the numbers of elk wintering on the Preserve are not well known.

Salting in the Preserve and along the boundaries is planned by cooperation of the Rod and Gun Club and the U. S. Forest Service which may give a shorter period of game use of the winter range. Previously salt had been placed at winter range elevations, but it is hoped local aerial distribution will be more effective. Mr. Cheney is carrying out the salting plan.

Submitted by:

Merle Rognrud, Assistant Big Game Leader
Wildlife Restoration Division

May 10, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

DEERLODGE UNIT

SPECIAL ELK SEASON INVESTIGATION AT

C. L. Boyer Ranch, Beaverhead County

DATE:

Winter of 1947-48

PERSONNEL:

Richard L. Hodder, Fieldman, Wildlife Restoration Division

Eldon J. Baker, Field Assistant, Wildlife Restoration Division

Charles R. Price, Deputy Game Warden

John Judge, Local Resident

PURPOSE:

The purpose of this study was to determine the effectiveness of a special elk season on the C. L. Boyer Ranch in Grasshopper Valley, Beaverhead County. This season was initiated as a management practice intended to alleviate damage to private property by elk wintering in this area.

DESCRIPTION OF TERRAIN:

The country in which this special elk season was opened is found within the Deerlodge Big Game Management Area in Sub-unit No. 7. The

area is located on the west side of Grasshopper Creek opposite Polaris. The size of the area is approximately fifteen square miles, bounded on the south by the Jackson Road from Tash's corner to the Boyer Lane, on the west and north by the Boyer lane and the Forest boundary, and on the east by the Elkhorn Road.

The area opened to hunting was wholly on private land, the majority of which is used for growing both wild and cultivated hay. The area from which the elk come to feed on this private land is Forest Service land adjacent and contiguous to the Boyer Ranch. It is composed of timbered hills with lanes of aspen trees extending down the creek bottoms onto private land.

HISTORY OF ELK IN AREA:

Elk in this area are native elk, that is, they have not been planted here or anywhere in the vicinity. Their migration into the area has been a gradual one. Twenty-five years ago it was a very exceptional occasion to see an elk in these parts. Evidently the first elk seen were merely passing through the country, for elk have been an oddity in this area until the last few years. It is thought locally that these elk may have originated from around Odell Creek and the Clay Banks country of Wise River. Lately, within the past few years, elk have increased rapidly. Mr. John Judge of Polaris estimates that there is now a total of about 50 head of elk in the vicinity.

Within the last two years, elk have been seen on the east side of the Elkhorn Road. Mr. Judge reports that two years ago three bulls wintered on the north side of Billings Creek and White Creek in the school section. Last year one bull wintered on the point of hills behind Polaris. Three

bull elk were seen by this Big Game crew on Dyce Creek last December 24th further down the valley. On February 20th of this year, elk tracks were seen again close to this same place, this time on Scudder Creek north of Mill Point. Calf tracks were also seen suggesting that this estimated six or seven head were composed of cows and calves and not bulls. On April 15th, four bulls were seen on Tash's hayfields. These four were last seen entering Harrison Canyon south of the Jackson Road on the opposite side of the valley from the Scudder Creek area. Mr. Frank Nay reports that from ten to twelve head of elk have been seen occasionally in the hills behind his ranch in Buffalo Creek. This area is located further south toward Bannack.

PROCEDURE:

Mr. Boyer was contacted early in the fall because complaints of elk damage were evident during the preceding season. At this time, there had been no damage, or threat of damage this season because the elk were still high in the hills.

Mr. John Judge of Polaris, whose home is situated just across the narrow valley from this troublesome spot, was contacted. He has a keen interest in these elk, and has made a habit of watching this area, noting the numbers of elk that come down into the haystacks in the late evening and return to the timber in the early morning. Mr. Judge has kept a faithful record of numbers of elk that he has seen on the Boyer Ranch from December 24th to April 4th, the last date that elk came down to the stacks this spring. This day by day record is included in this report for reference.

Elk began coming into the Boyer fields early in December after a heavy snowstorm. An insistant complaint from Mr. Boyer was received by the

Department of Fish and Game, and so on Sunday, January 11th, 1948, a drawing was held for special licenses. The season thus opened was for the taking of 25 bull elk within the afore mentioned boundary. This drawing was held at Polaris and was supervised by Deputy Game Warden Charles R. Price. Coincidentally, Mr. Boyer's name was the first name drawn from the candy jar by Mrs. John Judge. This special season was of thirty-five days duration, ending on February 15th.

FINDINGS:

This special season was effective in that practically no elk came down onto private land from January 11th, to February 15th. As far as can be determined, only one elk was killed in this area.

Daily Record of Elk Seen at Haystacks On C. L. Boyer Ranch

Month	Day	No. of Elk Seen	Month	Day	No. of Elk Seen	Month	Day	No. of Elk Seen
Dec.	24	7	Jan.	10	7	Mar.	10	10
	26	7		11	12		11	11
	27	7	Feb.	17	8		12	10
	29	4		18	6		19	11
	30	7		19	9		21	11
Jan.	2	7		20	10		25	6
	3	5		21	11		26	11
	4	7		24	8		27	6
	5	7		25	66		28	10
	6	12	Mar.	2	4	Apr.	1	5
	7	12		3	5		2	7
	8	12		5	6		4	6
	9	7		9	10			

Special Season - January 11th to February 15th.

On the morning of February 17, 1948, one day after the close of the special season, eight elk appeared in the fields. Elk continued to enter

private land and to damage haystacks until April 4th, 1948. At this time, warmer weather had melted sufficient snow in the hills to the north and west of the hunting area so that the elk could find feed and so moved elsewhere.

At no time during the winter were more than twelve elk seen in any one day. When elk entered the area, they usually followed down one of the aspen stringers along a creek and then cut across the fences to the stacks of hay. Mr. Judge observed that these elk never returned to the Forest by the route that they used to enter the area. It was also observed that different routes into the area were used on successive days, the elk never choosing to retrace their course of the preceding day. Although some cows and calves had been observed on this private land, it was only the bulls that did any damage to haystacks.

RECOMMENDATIONS:

The Beaverhead Sportsmen's Association of Dillon has made the recommendation that an extended season following the regular elk season be held for the taking of 25 bulls in the same area as was the special season this year. The Club recommends that this extended season be continued until April 1st.

Mr. Boyer's personal recommendation is similar to the suggestion above except that an extended season for 25 bull elk ending on March 15th would be long enough to discourage the troublesome elk.

The recommendation of this Big Game crew is to have an extended season following the regular season in this area, the boundary of which will be the same as during this last season. Instead of a 25 bull limit, it is proposed that a 15 bull limit be set during the coming year as there has, to date, been only twelve offenders seen at the stacks. Also,

this particular country is so difficult to hunt that it is very improbable that this number will be taken. It is also recommended that the length of the season be extended to March 15th. This extension of the season should so discourage the elk from coming down that they probably will not do so after this date.

May 8, 1948

Submitted by:
Richard L. Hodder, Fieldman
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

DEERLODGE UNIT

WISE RIVER-BIG HOLE MOOSE REPORT

DATE:

July 31st to August 29th, 1947

PERSONNEL:

Bob Neal, Field Assistant, Wildlife Restoration Division

J. E. Gaab, Fieldman, Wildlife Restoration Division

Stanley Mongrain, Wildlife Restoration Division, spent a week with Bob Neal from August 14th to August 20th, substituting for J. E. Gaab who left the Beaverhead Forest to attend the Upper Gallatin Conservation meeting and ride.

PURPOSE:

This survey was made to determine the number of moose (Alces americana Shirasi) in the Big Hole-Wise River unit in relation to the carrying capacity of the moose habitat within the unit.

ACKNOWLEDGMENT:

The participants of this survey party greatly appreciate the cooperation given them by officials of the Beaverhead National Forest.

The observers were grateful for the use of Forest Service facilities and for cooperation in planning methods of travel and routes to be taken.

LOCATION OF THE AREA (Beaverhead County):

The area surveyed included the drainage of the Big Hole River from its headwaters as far down and including the Wise River drainage on the south side and to the Deep Creek road on the north side, also the drainage of Grasshopper Creek as far down as Buffalo Creek drainage on the west side and the Dyce Creek drainage on the east side.

PROCEDURE:

The area surveyed was traversed by pack and saddle horses. A three-quarter ton truck pulling a two horse trailer was used to move the horses and camp equipment from one major drainage to another. The routes of travel are shown on a map on page 138.

FINDINGS:

1. Sixty-five moose were accounted for during this survey. Thirty-five moose were reported by Walter Melchure, the Grasshopper Cattle Association rider. Mr. Melchure observed these moose in the spring when packing salt on the Association range. The same area was covered during this survey and little moose sign was observed.

2. The willow browse in the Wise River area shows considerable use.

3. The area covered during this survey has considerable typical moose habitat, that is, wide swampy willow creek bottoms that are bordered by lodgepole and spruce timber. Much of this habitat in the Big Hole area shows very little use, either past or present.

4. The distribution of moose at this time of year is very detrimental when trying to make a census, or to estimate the moose population.

5. Mountain goat sign was observed at the head of Elkhorn Creek and in the vicinity of Alder Peak both on the Wise River drainage. Two mountain goats were observed at the head of Little Lake Creek, however, numerous sign observed along the Divide between Little Lake Creek and Big Swamp Creek led the observers to believe that there are possibly about ten mountain goats at least in that area. One goat was observed at the head of Berry Creek.

One mountain goat was seen near Pintlar Pass and one possibly winter killed goat carcass was observed near Pintlar Pass. Visibility was poor due to snow and rain when in this area.

6. The following drainages are where elk sign was observed:

Rabbia Creek - (Mr. Lyon, cattle-herder, counted forty-four elk on this creek in the spring. He believes that these elk winter in Warm Springs Creek.)

Upper Lacy Creek - Little sign.

Sheep Creek - Little sign.

Beaver Meadows on Shoestring Creek - Little sign.

Selway Creek - Little sign.

Berry Creek - Little sign.

Big Swamp Creek - Sign of about five head.

Pintlar Creek - Abundant sign.

Fool Hen Ridge - Little sign.

Fish Trap Creek - Sign of several.

Trail Creek - A pilot reported ninety elk wintering on this drainage last year.

It was reported by William Schultz, Deputy Game Warden, that elk that summer along the Continental Divide from the Pintlar Peaks to the head of Trail Creek drift into the East Fork of the Bitterroot River to winter.

7. The mule deer sign observed was mostly on the northeast end of the area surveyed. That is, along the lower portions of the Big Hole and Wise Rivers. The area on both sides of the Big Hole River as far up as the towns of Jackson and Wisdom has a lesser population of deer due probably to extreme snow depths during the winter months.

8. The amount of black bear sign observed throughout the area leads the observers to believe that their population is low in comparison with other big game hunting areas.

CONCLUSIONS:

1. The observers feel that the number of moose seen and the amount of moose sign observed during this survey is not a very representative amount from which to draw any very logical conclusions.

2. It is only probable that the Wise River-Big Hole Unit has a population of 300 moose.

3. The Wise River area shows a greater amount of past use by moose than do any of the Big Hole River drainages above Wise River, with a possible exception of Warm Springs Creek.

4. The amount of moose habitat in the Big Hole River drainages above Wise River that shows only a minimum amount of forage use leads the

observers to believe that the moose population is below carrying capacity.

5. The forage use in the Wise River area is an indicator that the carrying capacity has been reached in past years. From an interview with Al Muchmore, Wise River Forest Ranger, it was concluded that some moose from the Wise River drainage have migrated out of the area into adjacent areas which contain typical moose habitat; such as, Jerry Creek and Quartz Hill. The increasing number of moose in the Grasshopper Creek area in more recent years may be explained by a drift from the Wise River area.

6. The Grasshopper Creek area contains considerable moose habitat, but because of private land ownership, the increasing moose population must be controlled to avoid extensive haystack damage.

RECOMMENDATIONS:

To acquire an accurate moose census in the Big Hole-Wise River unit, a survey conducted during the months of June or from September 15th to October 15th would probably be more successful than any other time during the year.

NOTE:

If and when we can contact the last year's license holders as to their success, a supplement should be made. We have seventeen out of 30 to date.

Submitted by:

J. E. Gaab, Fieldman

Wildlife Restoration Division

April 26, 1948

Beaverhead County Open Season on Moose



— Routes of Travel by Survey Party
— Units No. 1 and No. 2

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

DEERLODGE UNIT

SUPPLEMENT TO WISE RIVER-BIG HOLE 1947 MOOSE REPORT

BLOODY DICK CREEK AREA

On August 11th, 1947, Bob Neal, Field Assistant and J. E. Gaab, Fieldman, Wildlife Restoration Division, visited the Jack Brenner ranch on Trail Creek, a Horse Prairie Creek tributary in the Bloody Dick Creek area, Sub-Unit No. 2.

Previous damage reports from this ranch have led to an open season on ten mature bull moose. In discussing the moose problems with Mr. Brenner, he reports that the moose haven't done as much damage as in past years. He states that perhaps his livestock have become accustomed to them and that the moose have learned to respect fences. He also believes that within that area, the moose have trebled in population in recent years. Discovering many pairs of twin calves in that area, the local people believe that a cow moose has a single calf the first year she conceives and twins each successive year.

Submitted by:

J. E. Gaab, Fieldman

Wildlife Restoration Division

April 26, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

FLATHEAD-SUN RIVER UNIT

EARLY SPRING INSPECTION

SOUTH FORK OF THE FLATHEAD RIVER

DATE:

March 5-13, 1948

PERSONNEL:

Russell Cloninger, U. S. Forest Service

Merle Rognrud, Assistant Big Game Leader, Wildlife Restoration
Division

PURPOSE:

The annual early spring inspection of big game winter range along the South Fork of the Flathead River is made for recording trends in numbers of elk, sex ratio and composition of the elk herd. General observations are made on utilization of forage and the range condition, game movement and concentration areas, physical condition of the elk, predator numbers and activity. Snow measurements are made at regular stations, winter killed elk are noted and other miscellaneous information collected.

PROCEDURE:

Inspection of the wintering South Fork elk herd was made in cooperation with the U. S. Forest Service.

A preliminary aerial reconnaissance was made March 5th over the South Fork and Middle Fork Rivers and the Sun River drainage. (See map for flight route.) Personnel making the four-hour flight were: Russell Cloninger, U. S. Forest Service; Lowell Adams, Fish and Wildlife Service; Ken Thompson and Merle Rognrud, Wildlife Restoration Division; Bob Johnson, pilot, of the Johnson Flying Service.

After landing at Basin Creek with the ski equipped plane, the ground inspection was made on skis along the East River Trail to Spotted Bear Ranger Station. (See map for ground route.) The ground crew traveled from Spotted Bear Ranger Station to Coram Ranger Station with a jeep snowmobile.

FINDINGS:

Aerial Reconnaissance - The preliminary flight proved valuable for locating the elk herd groups and winter range boundaries shown by tracks and elk seen. Although an accurate record of the sex and age of elk could not be made in most instances from the plane, these data were recorded when identification was positive. A paucity of calves was noted during the flight.

Following is a summary of game seen on the three major drainages. A tabulation by locality is given on page 144 for the South Fork area.

Game Seen By Aerial Reconnaissance

March 5, 1948

Drainage	Elk					Total	Moose	Deer	Coyote (Predators)
	Bull	Cow	Calf	Uncl.*					
South Fork	43	25	7	279		354	1	19	8
Middle Fork	4	3	3	94		104	3	0	0
Sun River	--	--	--	29		29	0	0	0
Totals	47	28	10	402		487	4	19	8

*The unclassified elk were mostly cows as antlered elk were recorded.

The elk were not found wintering above the Big Slide on Big Salmon Creek, above the Forks of White River, above the mouth of Babcock Creek or on Danaher Creek more than three miles above the mouth of Limestone Creek.

Elk were found concentrated (up to 75) on Twin Creeks, Youngs Creek, Basin Creek and at Danaher, in the South Fork drainages. Middle Fork elk were found using Winter and Cox Creeks and Lunch Creek areas in bands of 25-50 animals. Most elk were seen wintering in scattered small groups along the creek and river bottoms.

Ground Inspection - During the inspection six days were clear and two days were cloudy with snow flurries. At Big Prairie the lowest winter temperature was -35°F on March 10th. Prior to that date the low had been -30°F. Notable was the apparent greater frequency of wind in the South Fork when compared to past winters.

Snow Conditions - The snow was crusted and drifted in the open

areas. Bare spots were appearing on the south exposures above Basin Creek, at Big Prairie, Woodfir Creek and Horse Ridge. Measurements for the mentioned localities are given below.

South Fork of Flathead River
Snow Depth in Inches, March, 1948

Area	Snow Depth	Area	Snow Depth
Danaher	30"	White River Flat	24"
Rapid	38"	Salmon Forks	24"
Head Ayres Creek	40"	Black Bear	36"
Basin Creek	28"	Meadow Creek	28"
Camp Creek	30"	Spotted Bear R.S.	28"
Cayuse Creek	26"	Trout Lake	60"
Big Prairie R.S.	20"		

Average snow depth was 30" for the South Fork River in March, 1948.

Game Seen -

Elk:

A table showing the elk seen by sex and age classes is given below.

South Fork of Flathead River

Early Spring Inspection Summary of Elk Seen March 6-13, 1948

Locality	Bull	Cow	Calf	Uncl.	Total
Danaher	2	9			11
Rapid Creek		2	1		3
Basin Creek	1			6	7
Big Prairie	1	27	5		33
White River	4	22	1		27
Salmon Forks	7	14	4		25
Black Bear		11	1		12
Meadow Creek	2	2			4
Spotted Bear-Dry Parks				258	258
Riverside	2	35	10		47
Totals	19	122	22	264	427

The herd composition computed from the above classified elk is given by percentage below.

Herd Composition, March, 1948

	Bull	Cow	Calf	Total
Number Identified	19	122	22	163
Percent	13	74	13	100

The elk herd composition in the South Fork drainage for previous years is as follows.

Herd Composition

	:	Bulls	:	Cow	:	Calf	:	Total
	:		:		:		:	
<u>1941-42 Winter Study</u>	:		:		:		:	
Number Identified	:	325	:	711	:	336	:	1,372
Percent	:	24	:	52	:	24	:	100
	:		:		:		:	
<u>1946 Spring Inspection</u>	:		:		:		:	
Number Identified	:	87	:	233	:	142	:	462
Percent	:	20	:	50	:	30	:	100
	:		:		:		:	
<u>1947 Mid-Winter Inspection</u>	:		:		:		:	
Number Identified	:	137	:	617	:	135	:	889
Percent	:	15	:	70	:	15	:	100
	:		:		:		:	

Graphic representation of the trend in herd composition is given on page 154. Data for the years 1943 to 1945 are not available, but the decrease in calves since 1946 is apparent. The reduction recorded in 1947 is partially explained by the record 1946 hunter kill which was 10% calves. Although the cows and bulls were harvested in approximately equal numbers during 1946, it is suggested that the kill of cows may have been heavier on the older, breeding animals. This could account for a continued lesser 1947 calf crop surviving in 1948. Furthermore, although the 1946-47 winter losses were not severe, cows and calves were most frequently found dead.

Hunter take of calves in 1947 was approximately five percent, as compared to 10% in 1946. Calves were probably not as numerous during the 1947 hunting season as in 1946. When the herd is represented on a percentage basis and the calves and bulls are lessened the cows then are more numerous.

Sex ratio for 1948 was 1 bull : 5.1 cows. Comparative ratios for years 1942 to 1948 are listed below. (In all computations bulls include

spikes and cows include females more than one year old.)

<u>1942</u>	<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>
1:2	--	--	--	1:2.6	1:4.5	1:5.1

Data are not available to determine whether the change in sex ratio is due to hunting. Prior to 1947 the area has had an either sex season. Information is needed on kill by age classes.

The trend in elk numbers has been downward in the South Fork drainage. This has been reported by all observers and is borne out in the recorded data. Notable was the lesser number of tracks seen for March, 1948 in the usual locations when compared to 1946. Presented below is a table indicating numbers of elk seen in March, 1948 by plane and by ground counts, by a weighted combination of the two and estimated numbers for each locality.

South Fork of The Flathead

Elk Count March, 1948

Locality	Plane	Ground	Combined	Estimated
Danaher	130	11	130	175
Basin Creek (Camp, Ayres, Rapid, Foolhen)	81	10	85	125
Youngs Creek	39	0	39	75
Big Prairie (Cayuse, Gordon Creek)	28	33	61	125
White River (Holbrook, Big Salmon, Woodfir, Phil Creek)	5	54	59	150
Salmon Forks (Little Salmon, Damnation, Helen Creek)	0	5	5	75
Black Bear (Hodag, Black Bear, Mid Creek)	0	13	13	100
Meadow Creek (Harrison, Bunker Creek)	10	2	12	75
Spotted Bear (Twin Creek, Spotted Bear River)	60	258	258	350
Riverside	0	47	47	75
Totals	353	433	709	1,325

A comparison of elk counts on the winter range for years since 1946 is given below.

South Fork of the Flathead

Elk Counts 1946-1948

Locality	1946	1947		1948
	Spring	Mid-winter	Spring	Spring
Above Spotted Bear	640	504	466	404
Below Spotted Bear	142	254	324	305
Totals	782	758	790	709

A trend of decreasing numbers is to be noted from the counts above Spotted Bear. Below Spotted Bear the counts are believed to indicate the effect of the Hungry Horse Closure. Elk increasing on the Closure are wintering in the Dry Parks - Twin Creek area below Spotted Bear. The latter elk winter concentration is over-utilizing the range and should be investigated to determine whether opening the closure to hunting would give a satisfactory reduction in this elk use.

Winter game studies in 1941-42 estimated the winter range carrying capacity for the South Fork area at 1,808 animals. Although the 1948 estimate for the wintering South Fork herd is possibly conservative at 1,325 elk, it is quite probable the herd has been reduced to near the range carrying capacity. It is believed more elk use the South Fork in the summer and fall, but winter in adjacent drainages.

Deer:

Six mule deer and four white-tail deer were seen near Spotted Bear Ranger Station. Two white-tail deer and ten mule deer were seen by plane near Spotted Bear Ranger Station and seven mule deer seen on Gorge Creek.

Moose:

One moose was seen by plane on lower Youngs Creek cliffs.

Predators:

10 coyotes - Danaher
4 coyotes - Big Prairie
2 coyotes - Spotted Bear

Total 16 coyotes seen

1 lion track - Danaher
1 lion track - Flatiron Mountain
1 lion track - Pine Creek

Total 3 lion tracks seen

Coyote tracks were common along the travel route. Danaher, Big Prairie, Salmon Forks, Spotted Bear are areas where coyotes are most numerous.

Weasel tracks were occasionally seen.

Fur Bearers:

Beaver were noted working from Big Prairie to the headwaters of the South Fork River.

One marten track seen at Rapid Creek.

Game Birds:

Four ruffed grouse were seen above Big Prairie.

Miscellaneous:

Several golden eagles were seen along the river and one bald eagle at Dry Parks. Raven, magpies were occasionally seen. Stellers jay, Canada jay and the mountain chickadee were also seen.

Game Movement and Concentration Areas:

The band of 75 elk found on Danaher Flats moved to the west foothills after a one-day storm. At Basin Creek the elk concentration had been moving between Ayres Creek and the river bottom, also up Foolhen Creek and Camp Creek to a lesser degree. Elk on Youngs Creek were moving along the bottom as far up as Babcock Creek. Big Prairie Flats had few tracks and scattered elk were found along the lower eastern hills and on Cayuse Creek. Elk were scattered along White River Butte and Limestone Creek. Two small bands of elk were seen moving across White River Flats and elk were more numerous about the mouth of Woodfir Creek. Phil Creek Hill showed few elk trails. Elk were scattered the remaining distance down river to Spotted Bear. Approximately 70 unduplicated elk tracks were counted between Meadow Creek and Spotted Bear for a check. Elk were heavily concentrated in the Twin Creeks area below Spotted Bear and a band of 47 was seen at Riverside.

Range Condition and Forage Utilization:

At Danaher the slopes of Ursus hill had been used lightly by elk as were Big Prairie Flats and White River.

Heavy utilization of browse was noted at Basin Creek and Twin Creeks by elk concentrations. Phil Creek hill and Hodag Creek did not have the utilization by elk bands as in former winters.

The range should generally improve excepting Danaher, Basin Creek and Twin Creeks if the present numbers of elk are approximately maintained or further reduced in the mentioned areas.

Game Condition and Winter Kills:

Elk observed at close range appeared to have a smooth coat of hair,

thrifty, active, and not noticeably thin. This condition indirectly reflects a more ample winter food supply. One calf appeared to be poor and not thrifty at Rapid Creek.

One female elk calf was found dead at the mouth of Camp Creek apparently caused by malnutrition. When autopsied the following conditions were found:

1. Externally the calf appeared thin with a smooth coat, but prominent mane.
2. Marrow of the bones a bright pink.
3. Paunch full of browse, the small intestine empty and one tapeworm, one bot larvae found in the section next to the stomach.
4. Liver appeared normal and free of flukes.
5. Lungs were inflamed with bright red color (lower lung of position the calf was found) was deeper color and tissues were filled with blood.
6. Heart appeared normal, was filled with blood.
7. Kidneys appeared normal, but without a fat covering and bladder almost empty.
8. Bot larvae found in the pharynx.
9. No appreciable amount of fat was found by the internal examination on any of the mesenteries or other usual places.

Discussion and Summary:

Several trends are notable when results of the annual spring inspections are compared. Smaller numbers of elk are wintering above Spotted Bear. The surviving calf in March, 1948, crop was lesser than 1946 and 1947. The bull-cow sex ratio has changed from 1:2 in 1942 to

1:5.1 in 1948.

Apparently the South Fork elk population is approaching the carrying capacity of the winter range. The only severe over-utilization of forage now occurs in the area between Spotted Bear and Dry Parks. Danaher, Basin Creek and Youngs Creek are still receiving heavy utilization by smaller elk concentrations. Elsewhere along the drainage the scattered pattern of elk probably results in more nearly a proper utilization of the available forage if actual measurements were made. Because elk are naturally gregarious it is probable local heavy utilization of forage during some winters cannot be prevented by continued reduction in numbers.

Since a further reduction of elk is desirable in some localities, the present hunting season will probably accomplish that much. Hunting success will be less in areas where elk are scarce, so to some extent, the desired adjustment may be made. An early bull season will tend to keep the later kill on cows and calves down unless an early fall storm would concentrate and cause the elk to move lower in elevation within easy reach of the hunters. In the latter case the hunting season should be closed when the kill approximates that of 1947.

Because the surviving calf crop recorded in March of 1947 and 1948 is probably not large enough to maintain the herd, particular attention should be paid to the elk kill in 1948 and the herd composition of March 1949 in order that the changes taking place be understood and any desirable management adjustments can be made.

RECOMMENDATIONS:

1. A May or early June recheck of the South Fork would be desirable to determine final winter losses, a supplementary green grass count and

possibly obtain information on calving.

2. The Hungry Horse checking station be operated during the entire open elk season. Also a more adequate check be made on the elk kill in the upper South Fork drainage by a roving crew or/and periodical checking points of entry. Here a breakdown by age (mature bull, spike, old or young cow and calf) would be desirable.

3. Preliminary fall measurements of forage growth be made in strategic areas to determine utilization by elk during the winter of 1948-49.

4. A mid-winter aerial reconnaissance be made of the South Fork for locating any herd concentrations and obtain a count.

5. The annual aerial-ground inspection be made in March 1949 along the same routes, but with a more thorough aerial coverage of Spotted Bear River and the Twin Creek-Dry Parks area.

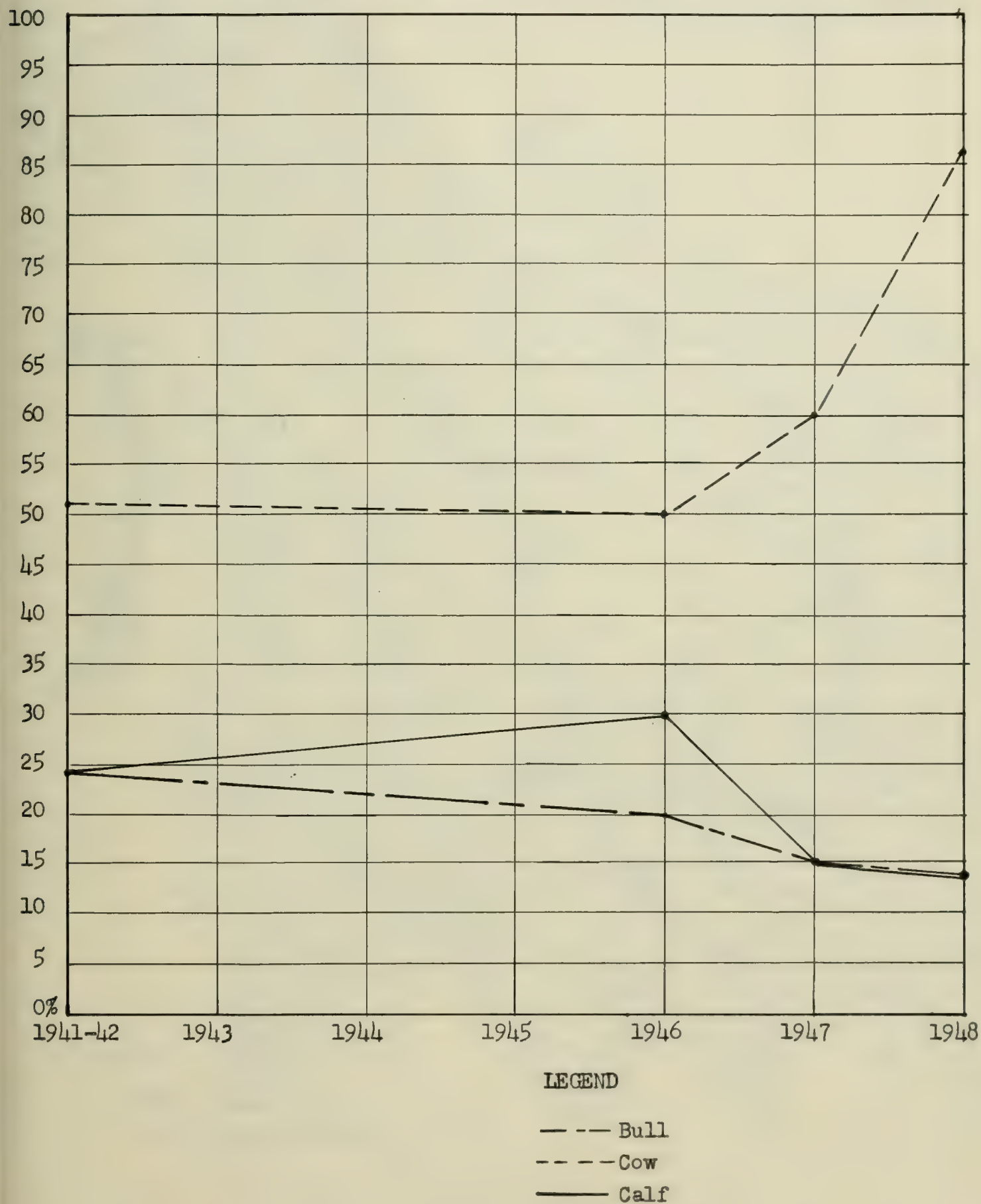
6. Investigation be made to determine the desirability of maintaining or removing the Hungry Horse Closure because the Twin Creeks are reportedly in the closure during the summer and fall.

Submitted by:

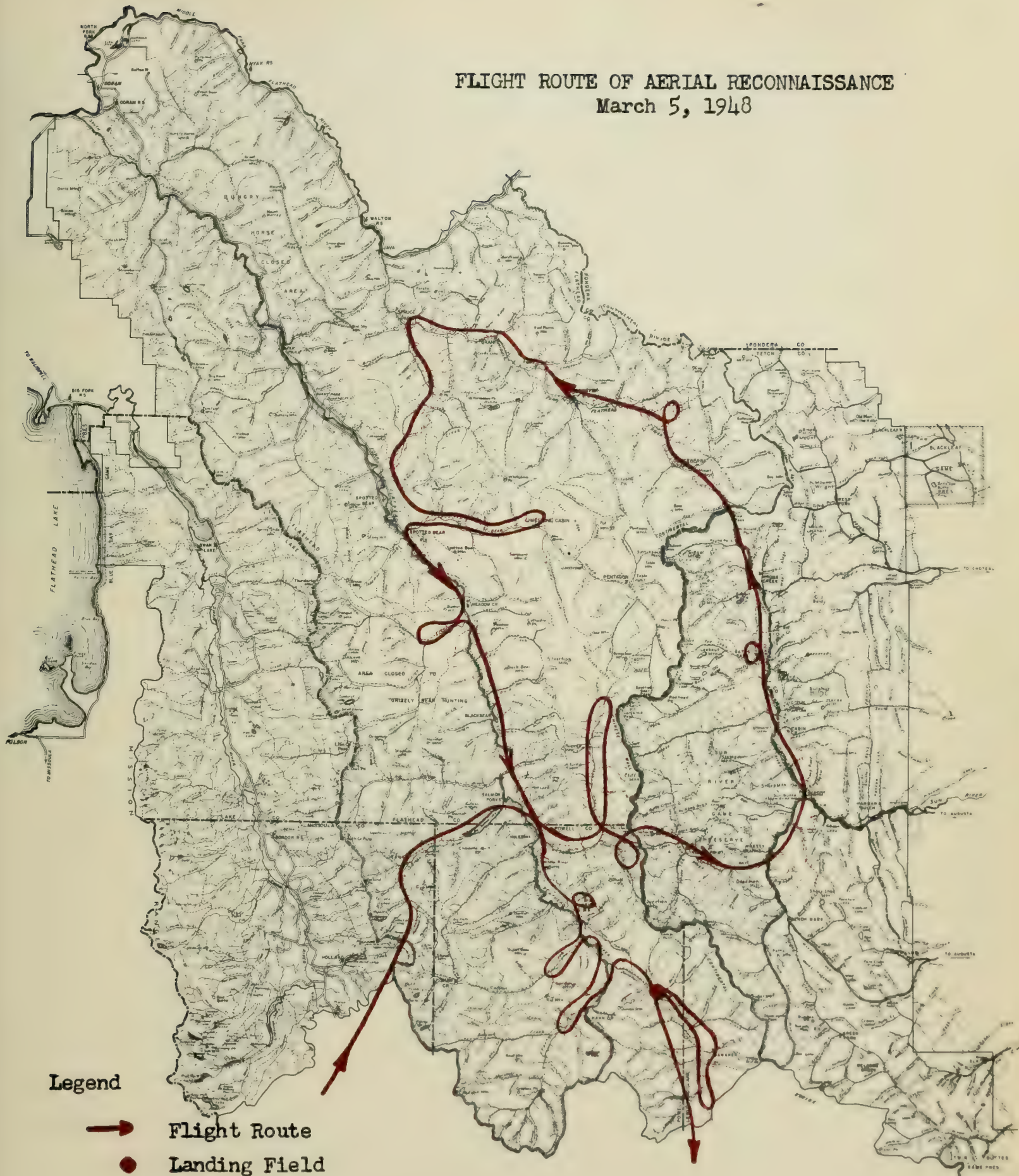
Merle Rognrud, Assistant Big Game Leader
Wildlife Restoration Division

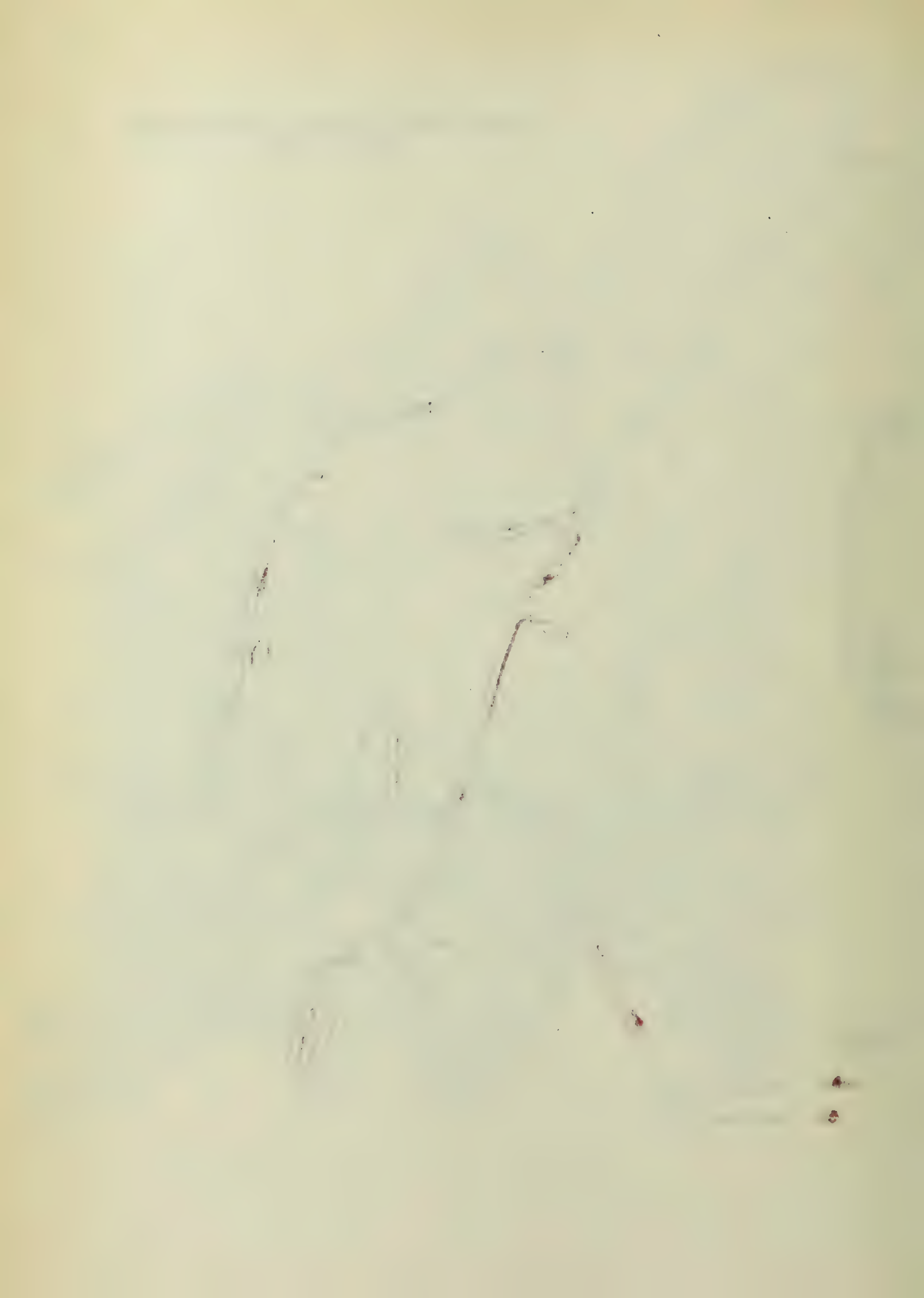
May 10, 1948

Composition of the South Fork elk herd computed from classified elk seen on winter game surveys during the period 1942-1948.

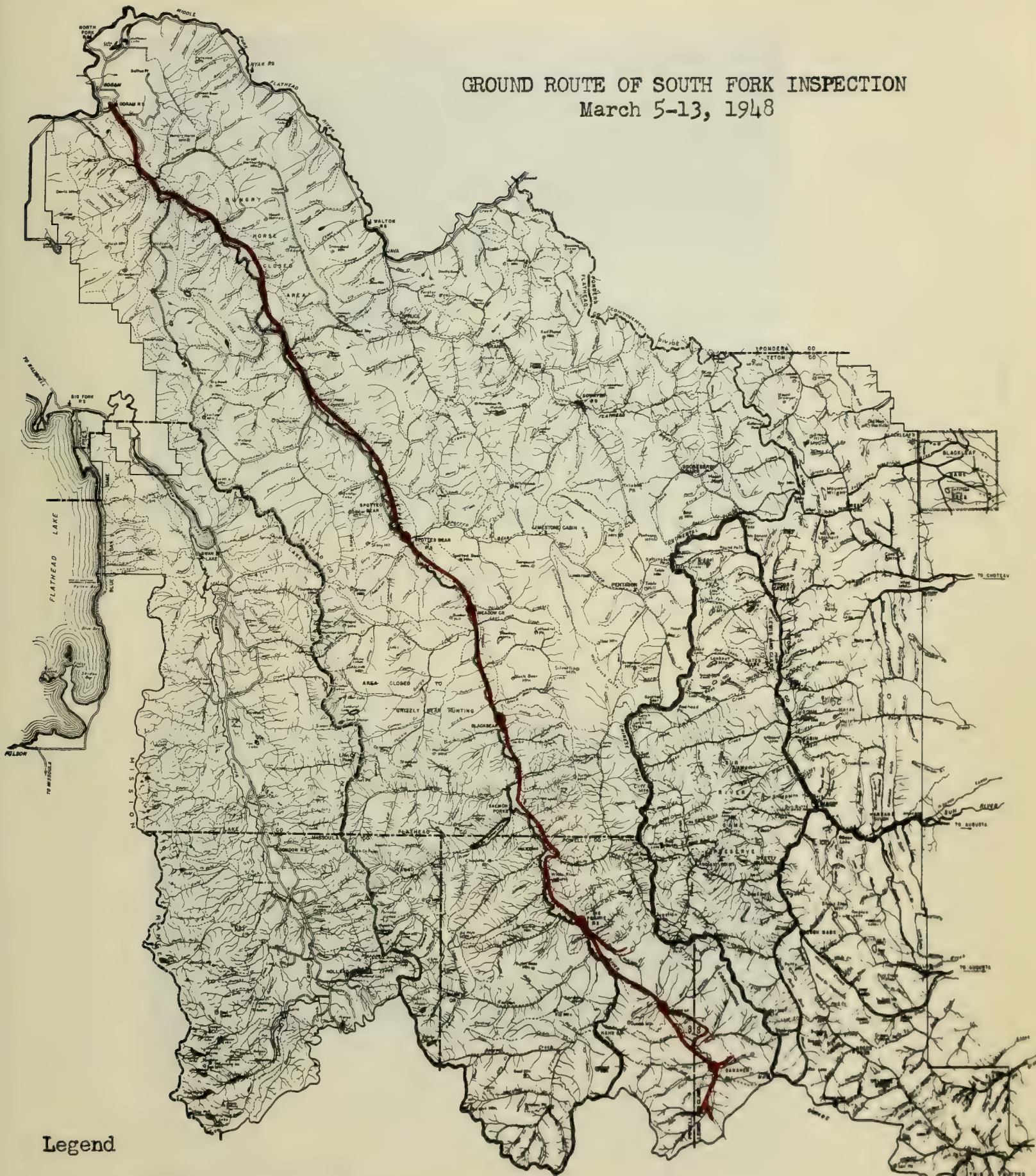


FLIGHT ROUTE OF AERIAL RECONNAISSANCE
March 5, 1948





GROUND ROUTE OF SOUTH FORK INSPECTION March 5-13, 1948



Legend

- Ground Travel
- U. S. Forest Service
Stations used by
ground crew



Skis were used for travel on the South Fork Inspection Trip.



Basin Creek Cabin
This station located along the travel route was used two nights
by the ground crew.



Aerial View of Big Salmon Lake in the South Fork Country
Swan Range is in the background.



This group of 104 elk seen from the plane in 1947 at Danaher
illustrates the value of a preliminary aerial reconnaissance
for locating elk. In 1948 a smaller group of 75 animals
were seen in this locality.



At Big Prairie this Douglas fir reproduction had been heavily utilized by elk during former winters.



This willow browse, available to elk at Basin Creek, had not been used during the winter of 1948.

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

FLATHEAD-SUN RIVER UNIT

MOUNTAIN GOATS AND ELK MIGRATION

AERIAL RECONNAISSANCE OF THE CONTINENTAL DIVIDE

DATE:

May 17, 1948

PERSONNEL:

Stewart Brandborg, Fieldman, Wildlife Restoration Division

Merle Rognrud, Assistant Big Game Leader, Wildlife Restoration
Division

Paul Choquette, Pilot

PURPOSE:

The flight was planned to locate mountain goats on Red Buttes, to determine whether goats were using adjacent areas and to determine the stage to which the spring season had advanced as indicated by snow factors which in turn would determine the necessary equipment and direct the approach to this area for the mountain goat study to be made during the next weeks.

Mountain passes which have been used by elk in migration were to be checked for possible traffic to date.

PROCEDURE:

A twin engine Cessna airplane piloted by Paul Choquette was used from the Helena airport to make this reconnaissance. The approximately 200-mile round trip required 2 hours and fifteen minutes of flying time. The route of flight is indicated on the map included with this report.

FINDINGS:

The crew left the Helena airport at 6:15 A.M. flying to Ford Creek where the following observations were begun.

Elk were found to be scattered along the open slopes of the South Fork and West Fork of Sun River. At Pretty Prairie 16 elk were counted on the low hills northwest of the landing strip. Snow was melted to 6,500 feet in elevation at Pretty Prairie.

Twenty-two bighorn sheep were counted on the southwest slope at the West Fork licks. The sheep appeared white and were easily counted from the plane.

Twelve elk were also seen at the West Fork licks. Eight elk were seen on the open slopes of Reef Creek. No snow remained along the West Fork Creek bottom several miles above Indian Point.

Red Buttes were reached at 7:04 A.M. The east facing cliffs and south slopes of Red Buttes were bare, although snow remained below the cliffs and along Indian Creek below the south slopes. The west and northern slopes of Red Buttes were completely covered with snow excepting a strip of bare ground along the crest of the west facing ridges which apparently had been cleared by wind during the winter. Hermit Lake was still frozen and snow covered.

One clockwise circle was made past the cliffs and bare south slopes of Red Buttes starting at 7:04 A.M. Approximately two and a half minutes were used for the swing at 85 miles per hour and 7,300 feet in elevation. Three mountain goats were seen on the south slopes and two on the cliffs.

Tracks in the snow a short distance north of Molly Creek Pass indicated a small band of elk had crossed the Continental Divide at this point. Apparently the snow was drifted and packed enough to support the elk with little breaking through the under crust.

The west facing slopes of White River were trackless and snow covered. The Chinese Wall cliffs were bare but the crest had a 10 foot to 15 foot snowdrift and the ledges which are used by goats in the summer were all filled with drifted snow.

Larch Hill Pass and the headwaters of Rock Creek were snow covered without bare spots. Elk had not crossed Larch Hill Pass.

Hart Basin and Lick Creek Pass were snow covered and without tracks to indicate elk migration.

The cliffs of Three Sisters Peaks were bare of snow and one goat was seen in two circles past the cliffs at approximately 7:30 A.M.

Goat Ridge, at its juncture with Three Sisters Peaks had bare places along the bench top up to several acres in size. Tracks of goat were seen in this locality.

Two circles were again made around Red Buttes at 7:39 A.M. Twelve goats were counted on the cliffs and south slopes of Red Buttes. The last circle was made high over the top of the Buttes where it was found the ridge tops had been windswept and were bare of snow.

In the flight south past the cliffs of Ahorn Creek and Junction

Mountain a set of probable goat tracks were seen, but the ledges were all snowed in and no use by goats were found.

SUMMARY:

The inspected section of the Continental Divide was heavily blanketed with snow. The cliffs of Red Buttes and Three Sisters with the adjoining windswept ridges were bare of snow and used by goats.

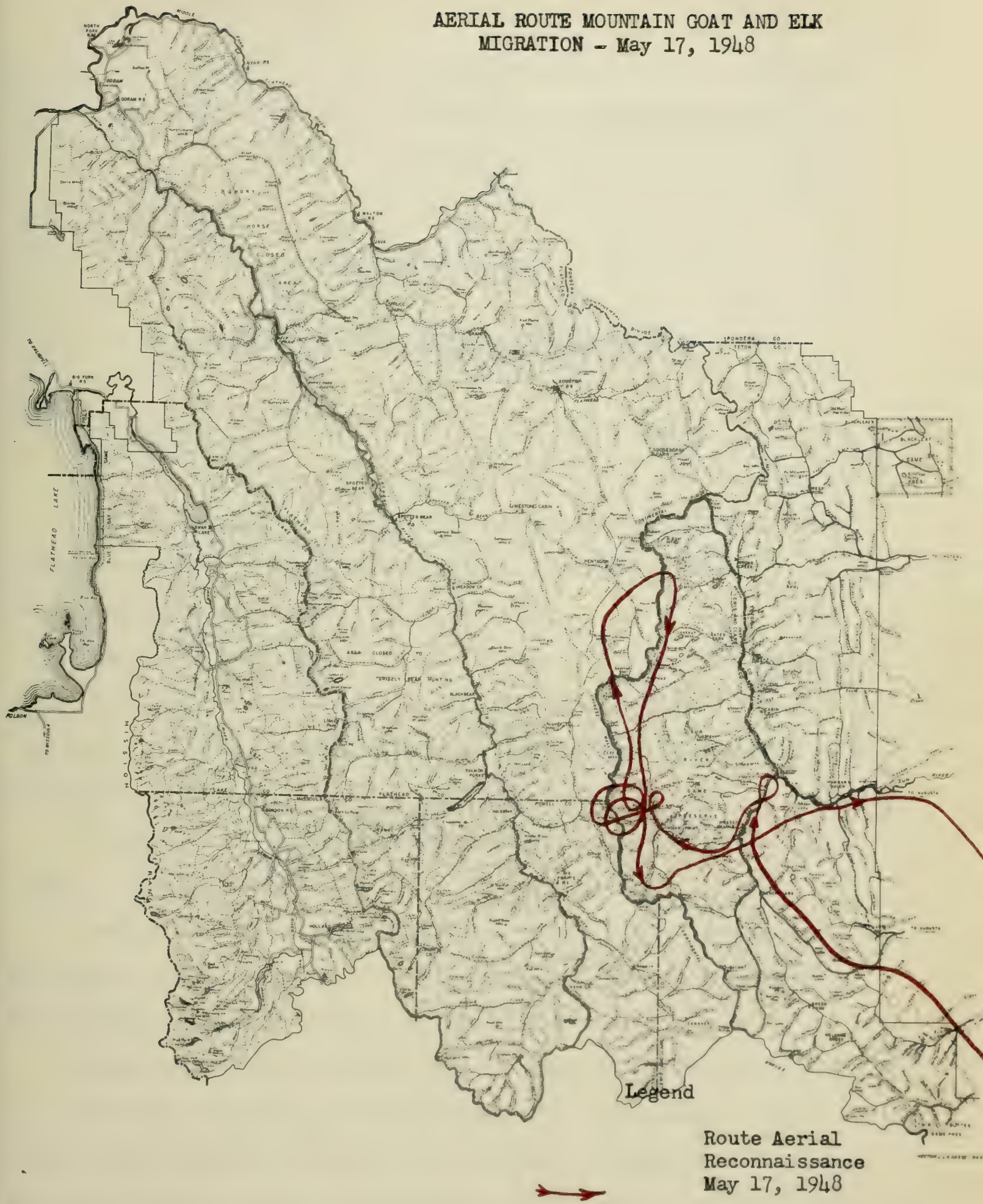
Twelve goats were counted on Red Buttes.

Elk migration has not occurred across the Continental Divide to this date. The several tracks seen at Molly Creek Pass were not sufficient to indicate any appreciable elk migration between the Flathead and Sun River drainages.

Submitted by:
Merle Rognrud
Assistant Big Game Leader
Wildlife Restoration Division

May 20, 1948

AERIAL ROUTE MOUNTAIN GOAT AND ELK MIGRATION - May 17, 1948





STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

FLATHEAD-SUN RIVER UNIT

SUN RIVER GUIDES AND PACKERS ASSOCIATION MEETING

DATE:

April 17, 1948

The spring meeting of the Sun River Guides and Packers Association was held Saturday afternoon, April 17, 1948, at the Forest Service Ranger Station in Choteau.

The meeting was attended by approximately 40 members and visitors. The U. S. Forest Service was represented by Mr. Leftwich, Mr. Fallman, Jack Hinman and Doug Morrison. The Fish and Game Department by Merle Rognrud.

Following is a summary of the meeting discussions and recommendations.

Mrs. Gleason, Secretary, reported on minutes of the last meeting. Mrs. Allan, President, reported on Montana Wildlife Federation meeting and the March meeting of the Fish and Game Commission.

Emphasized throughout the meeting was the need for organization and expression of problems, recommendations, etc. by the group. Recognition and consideration by the Fish and Game Commission and the Forest Service would be in proportion to the size and strength of the organization. That it is easier for State and Federal Agencies to work with a group

organization. Individual problems should be worked out and evaluated within the organization before recommendations representing the sentiment of the organization are made for presentation to a Government Agency.

The recreational use of the Lewis and Clark National Forest by 121,000 people in 1947 was reported. Approximately 29,065 were hunters and 19,000 fishermen, the balance miscellaneous activities.

Concern was expressed over the possible closing of the early South Fork of the Flathead elk season by the Commission. The South Fork area is usually not accessible to Sun River guides after October 1st. The organization recommended the hunting season be open as during 1947.

The group wanted to emphasize the small numbers of elk killed during the early 1947 elk season as follows: Allan 8, Wilkerson 3, Hatcher 0. Burdareau 1, Gale 10, Gleason 7, Baker 8, Klicks 3; totaling 40 bulls. The real significance was to the guides in being able to take hunting parties into the Wilderness Area during a slack month (September) between summer and fall business peaks.

The \$100.00 non-resident hunting license was discussed. The group attributed loss of business to the law when all species of big game cannot be offered and hunters are frequently not successful. The license also does not permit a hunting party to fish while in the back country.

A committee is to work on drafting an alternative gun license and extra cumulative big game fee for each species to replace the \$100. non-resident license next legislature. The organization felt some non-resident license patterned after the gun license and separate species fee would be more satisfactory. The details of amount of fee to be

charged for each species could be worked out.

Discussion of the proposed new guides license law followed with a committee to work on the law for presentation to the next legislature. The law would require a better standard of guide service to guests and eliminate some "fly-by-night" guides. All guides would be designated Deputy Game Wardens. The changed law is also being supported by the Dude Ranchers Association.

A motion passed for inquiry to the State Attorney General for clarification of who must have guides license in a hunting party. The section appeared controversial as the law at present reads.

Checking station legislation was discussed. Stations would not only record game kill but also serve to check guides for license and prevent re-use of game tags. Not all 1947 tags clipped and hence were not entirely satisfactory. The problem exists at Glacier Park as reported by Mr. Lucky and Mr. Mendenhall.

Recognized in discussion was the growing need for checking stations, especially in heavily hunted areas where a limited kill will be necessary.

A change in the U. S. Forest Service policy regarding Wilderness Areas heavily used for recreation was stated by Mr. Leftwich.

A Wilderness Area can have campsite improvement with simple fireplace, latrines and garbage pits. Also screened corrals and fences can be constructed to control local use of pasture by livestock in a Wilderness Area.

Control of campsites along the North Fork of the Sun River with responsibility of the guides for cleanup and sanitation of their base camps is planned by the U. S. Forest Service. This will be accomplished by designating campsites to be used by guides with a deposit for guarantee

of cleanup under a modified special use system. Guides would be protected from trespass on their allotted campsite area. Improved camp grounds will also be designated for use by the general public.

The guides and packers also expressed desire for opening the area from the Bars to Grouse Creek to use by campers and livestock. Argument in favor of this move was that the elk "firing line" would be eliminated. The U. S. Forest Service plans to investigate this possibility.

Mention was made for legislation to outlaw use of Garand rifle and 30-06 Army jacketed bullets which usually only wound game. This indicates sentiment is growing for legislation to regulate caliber of firearms used on big game as some other states have at present.

There has been expression of opposition to mountain goat trapping on Deep Creek by the Choteau Rod and Gun Club. Probably a factual discussion by parties concerned would be desirable as the opposition appears to be from mis-information.

A mention of elk calf tagging was made that there appeared to be some question of the desirability of continuing the program. Results of the program have not been publicized and the organization would be receptive to a report of work done and results obtained thus far with an explanation of how calf tagging information can and is being used.

Submitted by:
Merle Rognrud
Assistant Big Game Leader
Wildlife Restoration Division

May 18, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

GALLATIN UNIT

LAND LEASE INVESTIGATION FOR WINTER ELK RANGE ON

B. A. BLACK PROPERTY

DATE:

May 9th and 20th, 1948

PERSONNEL:

B. A. Black, Rancher, Gallatin Gateway

J. C. Urquhart, Forest Supervisor, Gallatin National Forest

L. C. Clark, Deputy Game Warden, Bozeman

Robert F. Cooney, Director, Wildlife Restoration Division

Faye M. Couey, Big Game Leader, Wildlife Restoration Division

Fred B. Williams, Chairman, Upper Gallatin Conservation

Committee

PURPOSE:

It has been proposed, following the severe winter this year on the Gallatin elk range and the accompanying damage by elk to private property in the vicinity of Gallatin Gateway, that the State Fish and Game Department acquire or lease lands in the vicinity of this damage to supply forage for these elk and possibly eliminate the conflict.

This investigation was to determine the possibilities and practicability of such a venture.

PROCEDURE:

The above personnel were contacted and the area on the ground inspected on the above dates.

FINDINGS:

It was learned that Mr. Black owns, controls, or has special grazing rights on 12,870 acres in the area occupied by this elk herd during the past winter. This constitutes most of the area used by the elk. This sum includes, 2,430 acres of deeded land, 360 acres of Bureau of Land Management holdings, 4,960 acres of Northern Pacific leased lands, and 5,120 acres of National Forest lands upon which Mr. Black holds a grazing preference.

This land lies on the north-draining slope southeast of Gallatin Gateway and extends from Bear Creek westward to Sheep Rock in the lower canyon. It lies above the canal and includes around 400 acres of cultivated land. Some of this is now planted to winter wheat.

There used to be sheep here, but for the past several years, use has been by cattle. Sheep used a portion of this range last year.

During the past winter from 75 to 200 elk have used this area and inflicted considerable damage to haystacks and fences lying below the canal. Rain in November caused severe crusts on snow and forced elk down much earlier than usual. A special elk season using permits was declared late in the winter, but was not very effective, largely

because it was opened after the elk had been forced down by these exceptional conditions and established themselves. Attempts to herd them at that late date proved futile. Similar conditions only to a lesser degree existed on lower Spanish Creek, which is just west of the area in question. On May 20, 72 elk were seen grazing in this area.

Some of the local sportsmen in Bozeman have suggested leasing this land by the State and Mr. Black is agreeable as he is not participating actively in ranching at this time. He is willing to give the State Fish and Game Department first chance as there are numerous stockmen clamoring for a chance to lease it.

CONCLUSIONS:

It was decided that the State should not lease these lands this year for the following reasons:

1. The area is not suitable winter range for elk because it lies in a snow belt and the forage is not available to elk when they need it.

2. Encouragement of elk to winter in this lower country is a mistake because there is no chance to control them and keep them away from the intensively farmed haylands. The size of the herd that could be maintained here would be so small that the expense of building elk proof fences could not be justified.

3. It is felt that the only way to control the drift of these elk is by hunting pressure which will either force them back up country or so reduce their numbers that damage will be minimized.

RECOMMENDATIONS:

1. The lands in question should not be leased by the State Fish and Game Department.

2. Hunting should be regulated such that there is an extended season following the regular season that will keep the elk back in the Squaw Creek drainage and also that will reduce the number that winter in Spanish Creek.

A tentative suggestion is following the regular season on either sex in the Gallatin, an extended season on bulls be continued until February 28, 1949. This area should include the Spanish Creek drainage and should be described in the eastside of the Gallatin as that area draining to the northward and located between Little Bear Creek and Sheep Rock on the Gallatin River, and bounded on the south by the divide between Squaw Creek and the Bear, Wilson, Yankee and Jack Creek drainages.

June 5, 1948

Submitted by:

Faye M. Couey, Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

MADISON-RUBY UNIT

WILLOW CREEK ANTELOPE INVESTIGATION

DATE:

May 20, 1948

PERSONNEL:

Ranchers living in the area

Lynch Flying Service

Faye M. Couey, Big Game Leader, Wildlife Restoration Division

PURPOSE:

This investigation was made to determine approximate antelope numbers and to obtain sentiment of land-owners toward an antelope season.

PROCEDURE:

A flight of one hour and 15 minutes was made over this antelope range in a Cessna-140 plane.

Several ranchers in the area were interviewed regarding antelope numbers and their reaction toward a season there.

FINDINGS:

This investigation was prompted by the request of local sportsmen for a season on antelope. A tentative season was set based on this

request, of reports of 200 to 250 antelope in the area and because there was one complaint of damage by antelope in this area last winter (Omer Saller).

Since that time there have been several objections from ranchers in the area who don't want to have a season there. Their objections are not that their stock will be interfered with by hunters, but that there are insufficient numbers to justify a hunt and they don't want them molested.

The bulk of the area set up for hunting which is that part west of the Madison River, north of the Jefferson, east of U. S. Highway #1 and north of the Norris-Bozeman road, belongs to about four large ranchers. They have said they will post their lands if the season is opened and that will leave practically no open area in which to hunt.

In flying over this area, only 19 antelope were seen and these mostly in the vicinity of Willow Creek reservoir. They were scattered as the does are just in the process of having young. This doesn't represent a complete count of this small area, but all the antelope must be within these boundaries and if there were 200 or more it is felt more would have been seen.

Last winter a herd of 84 was seen near the town of Willow Creek on a rancher's hay field. Reports by others during the winter may have been duplications of this group and thus the exaggerated population numbers.

Ranchers contacted were Jess Francis, foreman of the Climbing Arrow south of Three Forks, Mr. Buttleman of Willow Creek, Earl Davis of Willow Creek and W. A. Denecke of Bozeman, and Mr. Kilgore

of Harrison. These ranchers do not believe there are over 100 antelope in this area at any time and they would like to see them increase. Such sentiment from people who own the land in which the antelope range should be considered.

CONCLUSIONS:

It is felt that the antelope population numbers are lower than have been previously estimated for this area.

The antelope damage that occurred last winter did not recur and cannot be used as an excuse for a reduction in antelope numbers.

The attitude of the rancher-land-owners of this antelope range indicates that they do not favor a hunting season there and several have voiced serious objection to a season.

RECOMMENDATIONS:

It is recommended that the proposed season on antelope in the Madison-Gallatin County area be reconsidered and not put into effect this year.

A careful count of the antelope in this and adjoining areas should be made this fall when the optimum census conditions occur.

Submitted by:

Faye M. Couey, Big Game Leader
Wildlife Restoration Division

June 16, 1948

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

MADISON-RUBY UNIT

ANTELOPE INVESTIGATIONS

CENSUS IN BEAVERHEAD AND MADISON COUNTIES

DATE:

Winter of 1947-48

PERSONNEL:

Richard L. Hodder, Fieldman, Wildlife Restoration Division

Eldon J. Baker, Field Assistant, Wildlife Restoration Division

John Fox, Pilot

PURPOSE:

The purpose of this investigation was to make a count of the antelope in the area open to antelope hunting in the southwestern part of Montana, and to make a check on those antelope recently planted in the vicinity of this area by the Wildlife Restoration Division of the Department of Fish and Game. This information may lead to more effective management plans and means of protection for newly planted herds in this area, and to a change of the hunting regulations in the area open to hunting, as far as sex and numbers to be taken is concerned.

DESCRIPTION AND LOCATION OF TERRAIN:

The description of the area open to antelope hunting in Beaverhead and Madison Counties is as follows: Beginning at Twin Bridges following the road to Dillon, thence following Highway No. 91 to Monida, thence following the Red Rock Lakes Road to the road which runs northward between the Snow-Crest and Gravelly Mountains, thence following this road down the Ruby River to Twin Bridges, the point of beginning. This area is open for the taking of one hundred buck antelope.

The areas included in these investigations were Sweetwater Basin, Rochester Basin, Frying Pan Basin, Grasshopper Creek, Blacktail Creek, Sage Creek, and Horse Prairie.

All of these areas are typical antelope ranges in that they are composed of low rolling hills covered with a mixture of sagebrush and grass types. The sage types are usually found at the lower elevations and the grass types on the higher hills and knobs. There is considerable variance in elevation in all of these areas providing range suitable for both winter and summer feeding.

PROCEDURE:

Each of the areas mentioned were investigated first from the ground by truck or horseback and on foot, and later from the air excepting the Horse Prairie section which was not observed from the air. Local residents and sheepmen in the field were contacted in each area in order to help locate probable areas and the usual haunts where antelope might be found. These contacts were well worthwhile, for each of these areas contains considerable country in which the antelope may be found and so the chances of finding many of them from the ground are

somewhat remote. For the same reason, the probability of counting all of them from the air is also unlikely. At most, the figures included here are indications of the antelope populations and are not intended to be conclusive.

FINDINGS:

Rochester Basin:

Many trips were made into this Basin, but it was not until February 14th that any antelope were seen. On this date one lone doe was seen in the Nez Perce side of Rochester Basin close to the Melrose-Twin Bridges Road.

On March 4th, a plane was hired at Twin Bridges by this big game crew for the purpose of counting elk in the Highland Mountains and for counting antelope in the adjacent Rochester Basin. Although, the Basin was well covered during this flight, no antelope were seen.

On April 3rd, eleven head of antelope were seen in the Nez Perce Hills in approximately the same place as the lone doe was seen previously.

While riding with Jack Siedensticker, a local rancher, he pointed out where antelope are frequently seen in the hills above his ranch in the fall. Last year he counted some 35 head in the breaks of these hills toward the Beaverhead River. He had no idea as to where they were at this time.

Lester Schultz, a rancher and pilot of Sheridan, reports that he saw 90 head of antelope on McCartney Mountain in the extreme southern end of Rochester Basin on February 1st; also 15-20 more on Stone Creek

were seen the same day. These were seen from the air while he was flying over the area.

Nick DeLeon of Melrose reports having seen 100 head of antelope between U. S. Highway #91 and the Nez Perce Hills of Rochester Basin. These antelope were seen on April 22nd.

Sweetwater Basin:

On April 1st, 1948, a plane was hired from Butte, and was piloted by John Fox. It was intended to cover all of the antelope country around Dillon to get an over-all picture of antelope numbers in this section.

Sweetwater Basin was the first area flown. For a time no antelope could be seen anywhere, but after several passes over the area where antelope were seen on the preceding day, they came out of the sagebrush in the creek bottoms into view. Five hundred and ten antelope were seen from the air in this Basin.

On the previous day more than three hundred antelope were seen here from the ground. Usually the groups of antelope found were composed of around sixty head making an accurate count difficult as they ran in a bunch past the pickup.

Sheepmen contacted in this area say that the antelope in the Basin often times range as far over to the east as the bare hills between the Ruby River and Cream, Ledford, and Robb Creeks. However, on investigation, no antelope were seen in this area.

Across the Sweetwater Hills west of the Basin on Carter Creek, a herd of antelope was reported by student flyers from the Dillon Airport. Upon investigation in this area, it was found that eighty-seven

head had wintered close to a spring on the Dodd Ranch. Mr. Dodd says that the antelope are at his spring most every morning. He has counted eighty-seven in the bunch, but he estimates that there are about 105 in the group.

Blacktail Creek:

Flights over this area were made on February 6th and on April 1st. No antelope were seen on either flight.

Mr. Herbert Mace, rancher and pilot on Blacktail Creek, has flown over the area often and he reports seeing antelope in this area frequently throughout the winter. He has counted at least 44 in his wire pasture - an enclosure containing an area of twenty-two square miles. This enclosure is evidently a favorite haunt of this herd during the winter. Mr. Mace estimates that a good fifty head winters in the Blacktail drainage.

Frying Pan Basin:

Antelope were planted in this area in 1947 and again in 1948. A total of 127 antelope have been planted here to date.

Considerable time was spent in attempting to get a satisfactory aerial check in this area because it is known locally that some antelope poaching has been going on this past winter in the vicinity of Argenta. However, no antelope were seen from the air.

Immediately after the flight, a ground check was made and forty-seven antelope were found between Long John Gulch and the Railroad track south of Birch Creek. The railroad engineer reports seeing these antelope often when making his run between Dillon and Butte. He reports

48 in this group and that they are very tame.

Subsequent investigations in this area show that there are at least 72 antelope in the Frying Pan Basin herd.

Grasshopper Creek:

Seventy-five antelope were planted in this area in 1947. Fifty-six additional antelope were planted in 1948.

No results were obtained from the flight in this section. No antelope have been seen by this crew either from the ground or from the air during any trips into the area. This country is extremely rough and inaccessible in many places, and it is difficult to get information on the antelope in the area because of its inaccessibility.

However, Mr. Shaffner, a rancher on the lower Grasshopper reports having seen about 10-12 antelope close to his ranch throughout the winter. This is the only report received of antelope seen in the Grasshopper.

Sage Creek:

This area was well populated with antelope some thirty-five years ago. It was a favorite hunting spot for the old-timers because so many antelope wintered in this area, many of them migrating to Centennial Valley to summer. These herds have now been decimated to but a very small part of their original numbers. Mr. Ernest Orr of the old P. and O. Ranch relates that most of these antelope were starved out of winter feed by the excessive use of the winter range by domestic sheep.

During the aerial survey on April 1st, 131 antelope were counted in the area between Little Sage Creek and the North Fork of Big Sage Creek. This is perhaps the most heavily populated section in this extensive antelope range.

Several ground checks were made in this area. The largest number of antelope seen in any one day was 106. These antelope were in small bunches of from 10-20 and were well scattered.

Antelope have been reported seen this winter from U. S. Highway 91 on the slopes of hills behind Armstead all the way to Dell and beyond. These antelope are usually in small bunches and well scattered just as those seen in Sage Creek.

Mr. C. R. Price, Deputy Game Warden, estimates that there are probably 250 antelope in the Sage Creek herd, about twice as many as were counted from the air.

Horse Prairie:

The Horse Prairie antelope herd migrated into the country, presumably from Idaho, about four or five years ago. This is a small herd, but it is reported by Mr. Charles Brenner that they are increasing rapidly. Ground checks in this area have been frequent, but no antelope have been seen in this area by the Big Game crew. Mr. Brenner says that 35 can be seen on the west side of the Horse Prairie Road usually opposite Red Point. Wintering conditions are severe in this area for antelope. Last spring several carcasses of winter killed antelope were found by Gus Mulky, the association rider in that area.

Waterloo:

This small herd was planted in 1946 near the town of Waterloo in sub-unit No. 1 of the Madison-Ruby Unit. Two truckloads of antelope trapped in the locality of Toston were unloaded in this area. In all, a total of 22 antelope were planted in the vicinity of Waterloo.

This area was flown by this field crew on March 4th in a plane from Twin Bridges. No antelope were located from the air.

The largest group of antelope reported seen in this planted area was 13 observed from the air during a flight by Deputy Game Warden Carl Daniel on May 21st. Heretofore he had reported seeing a group of five or six several times close to the sawmill near the road at Twin Bridges.

By combining the numbers of antelope seen by this Big Game crew within the area open to hunting - 510 in Sweetwater Basin and 131 in Sage Creek - a total of 641 were seen in the area this winter. By adding the most reliable reports of antelope seen in this open area this winter, the total is increased to 770. The estimated total in the open area is about 1,000 head maximum.

RECOMMENDATIONS:

It was the opinion of this crew that until some census figure was accepted, the buck law was most applicable to these herds in the open area, for protection of the does is necessary to build up a large herd. This view has now changed because of the number of antelope found in the area, and because of the percentage of accidentally killed does during a buck season was not previously realized. Having estimated the antelope in the open area to be as many as 1,000 head, it is recommended that instead of continuing the buck law in this area, a season on both sex be initiated for the taking of 100 antelope.

It is further recommended that a more complete investigation be made of the newly planted antelope herds as to both natural survival and

adaptation to the new habitats and to poaching by individuals, especially in the Grasshopper Creek area and in Frying Pan Basin around Argenta.

May 9, 1948

Submitted by:
Richard L. Hodder, Fieldman
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

MADISON-RUBY UNIT

RUBY RIVER DEER CENSUS AND INVESTIGATION

DATE:

February 9-12, 1948

PERSONNEL:

Richard L. Hodder, Fieldman, Wildlife Restoration Division

Eldon J. Baker, Field Assistant, Wildlife Restoration Division

William Schowey, Forest Ranger

Ronald Schultz, Assistant Forest Ranger

PURPOSE:

The purpose of this project was to gather information and data on the numbers and trends of the deer population in the upper Ruby River concentration area. This information when applied to the problems created by this deer herd should help forecast the rate of development of this herd, and should show the effects and results of past management practices. In the same manner, it should indicate and suggest measures necessary for more feasible management in the future, for the problems of holding this deer herd in proper sexual balance, of reducing the herd to the optimum number for which there is adequate winter range, thereby eliminating much of the destruction of private property, are major

problems indeed.

DESCRIPTION OF TERRAIN AND CONDITIONS:

The country referred to in this report is located in the Madison-Ruby Big Game Management Area in Sub-unit 3. It borders on both sides of the Ruby River from the Cottonwood Camp on the south to the Greenhorn Creek drainage on the north and a distance varying between one and three miles in an easterly and westerly direction, depending on the topography of the hills bordering the river. The country within these boundaries is composed of rough broken hills extending back into the Gravelly Mountains to the east and into the north end of the Snowcrest Mountains on the west. The hills are steep, usually timbered on the northern exposures and covered generally with a mountain mahogany vegetative type on western exposed sides. Considerable open grass areas, many of which extend up over the tops of these hills, are found on the southern exposed faces.

At the time of this census, there was snow in the area, but because of typically high winds and relatively fair weather, most of the open areas were comparatively bare, even on higher slopes. This snow condition caused the deer to be fairly well distributed, more so than would be expected at this time of year. Large concentrations of deer which were in the area both before and after the census were not apparent at this time. However, by persistent searching, considerable numbers were found in several drainages.

Until recently, this herd has not created any pressing problem. Deer numbers have increased steadily in this area for a number of years under the protection of both ranchers and sportsmen, but now damage is

being done to both private property of local ranchers and to the vegetation on the winter range.

It is thought by many people, including Deputy Game Warden Kohls of Ennis and Ranger Schowey of Sheridan, that many of these deer are driven into this area to winter by the hunting of does on the Madison side of the Gravelly Mountains. This extended season following the regular season drives the deer high into the mountains where feed is usually well covered by snow at this time of year. In just a short distance out of this hunting area over these low mountains, deer can find a haven in the upper Ruby Valley. This influx might explain the sudden increase of deer in the last few years in this area which was already reaching its optimum population.

PROCEDURE:

Ranger William Schowey of Sheridan was contacted early in the season. He explained the method and technique used by the Forest Service in this area last year, the date of last year's count, and the area covered during last year's census. It was decided that it would be feasible to use the same method and the same area as was used before so that a true comparison could be made between the data obtained last year and that obtained this season. The census was conducted on approximately the same dates as during the previous year.

The area to be studied was divided into five units, each of which could be methodically covered by a team of two men during the course of one day, yet be naturally bounded so that deer overflow from one unit to the adjacent one would be as small as possible. These units are delimited on the accompanying map and are numbered 1 through 5 for ease in identification. Unit #1 is located on the east

side of the Ruby River on the extreme southern end of the area surveyed. This unit starts at the Cottonwood Camp and extends down the river. It is bounded on the north by Warm Springs Creek and the South Fork of Warm Springs Creek. Unit #2 is bounded by Warm Springs Creek and the South Fork of Warm Springs Creek on the south and it extends down the river to the Canyon Camp. Unit #3 is bounded on the south by Canyon Camp ground and terminates on the northern side of Greenhorn Creek drainage. Unit #4 is located on the west side of the Ruby River opposite Unit #1. It also is bounded on the south by the Cottonwood Camp and it extends in a narrow strip down the river to the Canyon Camp. Unit #5 begins at the Canyon Camp ground and ends on the ridge between Cream Creek and Ledford Creek. This unit is composed largely of the Cream Creek drainage. In aggregate, these units outline an area of approximately sixty square miles.

Each of these units was covered on foot by two men working together. Non-adjacent units were worked simultaneously so that any overflow from one drainage would not be recounted in another by the other crew. In most cases, one member of a crew covered the country in the creek bottoms while his crew partner worked the higher country. The crewman at the higher level would then be in a better position to see deer on both sides and the bottom of the open drainages. The number of the unit, the name of the drainage, the time, and the number of deer in each group seen were recorded so that a check could be made for those deer that might have been counted twice, once by each crewman, and so be considered when totaling the figures. Classification of the deer seen was not attempted as it was during the preceding census, because at

this time of year distinguishing does from bucks is questionable except at close range.

FINDINGS:

A total of 2,104 deer were counted in the area designated. The total of the census conducted one year previously was 1,724. This total was composed of the following sub-totals.

Area	1948 Count	1947 Count	Difference
Unit #1	100	61	+ 39
Unit #2	384	467	- 83
Unit #3	1,206	788	+418
Unit #4	118	43	+ 75
Unit #5	296	365	- 69
Total	2,104	1,724	+380

RECOMMENDATIONS:

Conclusions reached from this study and from observations of the vegetation on the winter range indicate that this deer herd has increased beyond the optimum number for the area usable as winter range and the herd is still increasing. The 1948 census shows an increase of 380 head of deer seen over that of the previous year.

Since coyote populations have been materially reduced throughout both the winter and summer range of this deer herd within the last few months, it is reasonable to assume that the fawn crop will be higher in the future than in the past and that the death loss due to predators will

also be reduced. These facts lead one to anticipate a more rapid rate of increase of deer in this concentration area than heretofore unless the present number of breeding stock is reduced. Therefore, it is recommended here that a season on both sex be set for the coming hunting season for the taking of three hundred does. A kill of three hundred does, plus the expected number of bucks will lessen the number of deer in this herd and reduce the increasing tendency of the herd to further outgrow its available winter range. This season should be set simultaneously with and in a similar manner as the season on the Madison side of the Gravelly Mountains so that hunting pressure will be equalized on both sides of the range throughout the season.

It is also recommended that a checking station be operated by a competent and reliable man throughout the entire hunting season in order to obtain accurate information on the number, age, and sex of deer removed which will be essential data for the proper management of this herd in the future. It is further recommended that information on the weight, antler measurements, and other data be obtained at this station for research use by the Wildlife Restoration Division of the Fish and Game Department. This information is obtainable only from checking stations during the hunting season. This work should be instigated in order to promote progressive studies in various phases of deer management.

The upper Ruby Valley deer concentration area is unique in that its topographic features, vegetation, typical weather conditions, and deer population, make it as conducive to intensive continuous deer studies as any area encountered in this part of the State. It is

suggested that this area be investigated in the near future for the purpose of setting up long-time experiments and investigations in deer management upon which decisions, regulations, and management practices of more elusive herds may be based.

April 15, 1948

Submitted by:
Richard L. Hodder, Fieldman
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

MADISON-RUBY UNIT

BLACKTAIL CREEK ELK INVESTIGATIONS

AERIAL ELK CENSUS

DATE:

February 6, 1948

PERSONNEL:

Richard L. Hodder, Fieldman, Wildlife Restoration Division

Eldon J. Baker, Field Assistant, Wildlife Restoration Division

Herbert C. Mace, Rancher and Pilot

PURPOSE:

The purpose of this project was to gain sufficient accurate information on the number of elk wintering in the Blacktail drainage so that some management plans could be initiated. This herd has grown from both native elk and from planted elk, and until recently it has created no problem. In fact, it's existence as a large herd was known to very few. Most estimates of the size of this herd varied from 250 to 650 elk. These estimates were probably based on the history of the plant by the Beaverhead Sportsmen's Association of Dillon some ten years ago.

According to information received from Pete Westergard of Dillon about the planting of elk by the Association, there was a total of 113 elk shipped by truck from Yellowstone Park. Eighty-seven arrived at the mouth of Sheep Canyon, the point of release; one truck was "lost" and was unloaded near Lima. Of the 87 elk arriving on the Blacktail, there were 5 fatalities in transit leaving 82. Among the 82, there were 13 bulls in the shipment, which left a breeding stock of 69, providing they were all capable of reproducing. This is extremely unlikely; however, for the 69 probably contained some old unproductive cows and cows not yet of breeding age. By using this figure of 69 head, compounding it over a period of ten years at a yearly rate of increase, the normal being close to twenty per cent, indicates that the progeny of this planting plus the elk planted might now total about 430 elk.

It was agreed upon at the time of planting that no elk season would be opened in this area until ten years had elapsed from the time of planting. Now that this time limit has passed, there is a general movement by many people in this community to have some kind of an elk season in the Blacktail. This movement began last year at which time it was agreed upon by the Beaverhead Sportsmen's Association to request a season for the taking of 50 branch-antlered bulls. This request was received by the Game Department, but too late for action to be taken.

Before a season should be opened on any elk herd, a preliminary study should be made and a system or plan of management instigated; otherwise, it is likely that the herd will soon be decimated. On the other hand, it may increase beyond its natural bounds, over-grazing the winter feed available. It is the purpose of this paper to present

data obtained in this first step of building a management plan - a census to gather reliable data on the numbers of elk using the Blacktail drainage as a winter range.

DESCRIPTION OF TERRAIN AND CONDITIONS:

The Blacktail Creek drainage in which this census was conducted is located entirely within the Madison-Ruby Big Game Management Area in sub-unit #3. This drainage is bounded by the Blacktail Mountain Range on the southwest, and by the southern end of the Sweetwater Hills on the northeast. The source of the Blacktail Creek is located high in the Snowcrest Mountains to the southeast with the Creek flowing in a northwesterly direction emptying into the Beaverhead River at Dillon.

The valley bottom is used largely for growing both wild and cultivated hay for feeding cattle and sheep on the large, but relatively few ranches in the valley. The Sweetwater Hills forming the northeast side of the valley are rough broken hills on the lower end with mountain mahogany, sage, and grass growing up to the lower timber line. The higher end of the Sweetwater Hills is a sloping plateau broken by occasional washes and deep gullies. The vegetative type here is sage, usually with considerable expanses of open grass at the higher elevations.

The Blacktail Mountains on the opposite side of the valley are covered on the top and on the sloping sides with a grass and sage type of vegetation. In the steep rocky central section of the range, the sides of the mountains are timbered down to the alluvial fans formed on the valley floor. Steep canyons and gorges are common in this section, but on both ends of this range there are several roads leading to the grassy, rolling tops of these mountains to join the maze of sheep camp

roads that come into the area from the Sage Creek side.

Blacktail Creek heads in the rugged Snowcrest Mountains which separate the Blacktail and the Ruby River drainages. These mountains are high and do not have any roads passing through them. There are, however, several roads that run considerable distances up the East Fork of Blacktail Creek, up the Middle Fork of Blacktail, and up the West Fork to the Antoine Ranger Station and over the Clover Divide into the Centennial Valley. A road also runs from the Blacktail over the Sweetwater Divide into Sweetwater Basin.

This census was conducted on a bright sunny day, February 6th, following a snowstorm the previous night. Conditions were excellent - air was smooth with little wind or turbulence. Most of the elk were out where they could be seen easily.

PROCEDURE:

Considerable time was spent throughout the winter observing the location of the larger groups of elk in the lower Blacktail. These numbers and locations were recorded along with information collected from local ranchers about the larger groups of elk located further up the valley in inaccessible areas. This gave the crewmen a definite idea as to where to look for elk during the proposed census flight. A successful attempt was made to engage a pilot familiar with the valley and with the elk wintering areas in this drainage, for considerable time could be saved and at the same time many more elk could be found with a pilot who knew the country.

On February 6, 1948, Mr. Herbert Mace, a rancher on the Blacktail, and a competent pilot and owner of a Stinson Station Wagon airplane,

agreed to fly the big game crew over the entire drainage to count elk in that area. Mr. Mace is very familiar with this country for he flies over it considerably. He has also made several personal counts of these elk, once with Deputy Game Warden Price.

The flight began from the Mace home ranch. The first area flown was the lower end of the Blacktail Range with the upper Blacktail following. Then the areas between the Forks of Blacktail Creek were flown, and finally the area along the Sweetwater Divide including that high country at the head of Rock Creek, Robb Creek, and Ledford Creek. Small groups of elk which were easily distinguished were tallied directly from the air. Those larger groups on which a fast, accurate count was impossible were photographed from the plane. Later, these pictures were projected and enlarged, and the elk carefully counted. By the combination of these two methods, the census figure was reached.

FINDINGS:

A total of 993 elk were counted in the area delimited on the accompanying map. One crew member counted 1,004 elk while the other saw a total of 993. Because of this difference, the more conservative number of 993 is used.

Distribution of elk ranged through the entire Blacktail Range to Prices Canyon. Large groups were seen in the hills between the Middle Fork and the West Fork of Blacktail Creek, and more between the Middle Fork and the East Fork. Elk were also counted in the hills at the head of Rock Creek and Ledford Creek.

Many more elk were seen wintering above the Blacktail Range than in the range proper. Since the elk planted in this area are considered

resident elk and are there all year, it is indicated by large herds outside that the progeny of the Beaverhead plant is a minor part of the elk wintering in the Blacktail drainage. These other groups of elk evidently summer in the mountainous country at the head of Blacktail Creek around the Notch and Antoine Peak. They may migrate through the Snowcrest Mountains, cross the Ruby River into the Gravellyies. Some of them summer over near the Clover Divide by Centennial Valley. There is a suspected migration across the highway below Lima where forty head were seen crossing the road near the beacon light from the Red Conglomerate Mountains.

It was attempted to count all elk in the Blacktail drainage during this flight, however, it is known that there are substantial numbers of elk wintering in areas adjacent to the Blacktail which were not included in this count. For instance, there is a group of elk that have been close to the two dark buttes to the east of Lima throughout the winter. These elk have been seen regularly by the Government trapper in that area, Bill Schmuck. There are approximately 93 elk in this group.

RECOMMENDATIONS:

It is recommended that studies on this herd be continued throughout the coming spring and summer. A careful reconnaissance and range inspection should be made of the areas where the major parts of this elk herd have concentrated through the winter. These areas are indicated on the accompanying map. The analysis of range condition in these generally selected sites should indicate whether this herd has already reached its optimum number for the feed available in these selected feeding areas. It is recommended that numbers be limited largely to the carrying capacity

of the winter areas chosen by the elk themselves. It is the opinion of this game crew that regulating numbers of elk by the carrying capacity of the winter range that could be used by elk in an area is an error which will surely lead to difficulties. If this herd is allowed to increase to the capacity of the winter range available, those few selected spots will be so abused that damage will be evident.

A careful study of the range conditions by representatives of the Forest Service, of the Beaverhead Sportsmen's Association, the Fish and Game Department, and other interested agencies, as well as those ranchers upon whose land this herd winters, will bring about the formation of a workable management plan. This limitation of elk numbers determined by all groups concerned may be brought about which will produce a game crop to be harvested annually, and at the same time provide adequate feed and ground cover to protect other interests.

Because there have been reports of damage to private property by elk this year for the first time, it is indicated that this herd might already have reached beyond its optimum development unless artificial means of management are brought into use. It is felt that these means; such as, herding and feeding, are undesirable. If an overabundance of elk is allowed to develop in this area, sooner or later it will be necessary to reduce the number to what the range which the elk care to use will support, or the elk will migrate to new feeding areas to suit their choosing. The problem is already familiar to most all agencies managing big game.

It is recommended that a limited license season be open for the taking of 150 branch-antlered bulls during a special season following the

coming regular elk season this fall. This late season will allow most livestock to be removed from the range before the season begins. A kill of 150 bull elk is suggested because the annual increase of the elk counted during this census should be approximately 200 head. Because there has been no hunting season initiated in this area to date, there is a large percentage of bulls in the herd, some of which could be removed without materially affecting the annual estimated increase. If it is found by future range studies that this herd has developed an optimum population, the take during the next few years should be so regulated as to provide the desired number.

It is suggested that an aerial census be conducted each year for several years, at least, as a part of the studies of this herd so that a more substantial and reliable picture of this group of elk can be developed.

The boundary of the hunting area for the proposed season is recommended as follows: Starting from Dillon, follow the Blacktail Road to the Ruby River, thence up the Ruby River to Long Creek, thence down Long Creek to the Red Rock River Road, thence down the Red Rock River Road to Lima, thence down U. S. Highway #91 to Dillon. This suggested boundary necessarily includes much territory in which there are no elk, but it is a permanent tangible line around the area.

For the most part, this country in question is extremely accessible as there are roads from all sides leading into it. It is almost entirely open country. There is little of it that cannot be covered by Jeep. A general open season might make it possible for elk in the lower Blacktail to be cut off from their natural escape route and

be slaughtered. If this were to happen, it would naturally defeat the purpose of the season entirely.

With unlimited hunters in the area, and if the escape route of the elk were not blocked, the harassed elk would have no choice but to head for the upper Ruby country where they would be outside of the hunting area.

Practically all of the hunting area in question is owned or leased by a small number of ranchers. Unlimited sportsmen in the area would possibly create hunter damage in excess of elk damage, for to date, elk damage has been light. As these ranchers are businessmen, it is only logical to assume that if damage to their property will be less by not having hunters in the area, they will post their holdings to NO HUNTING. If this were to be the case, the purpose of the hunting season would be lost completely.

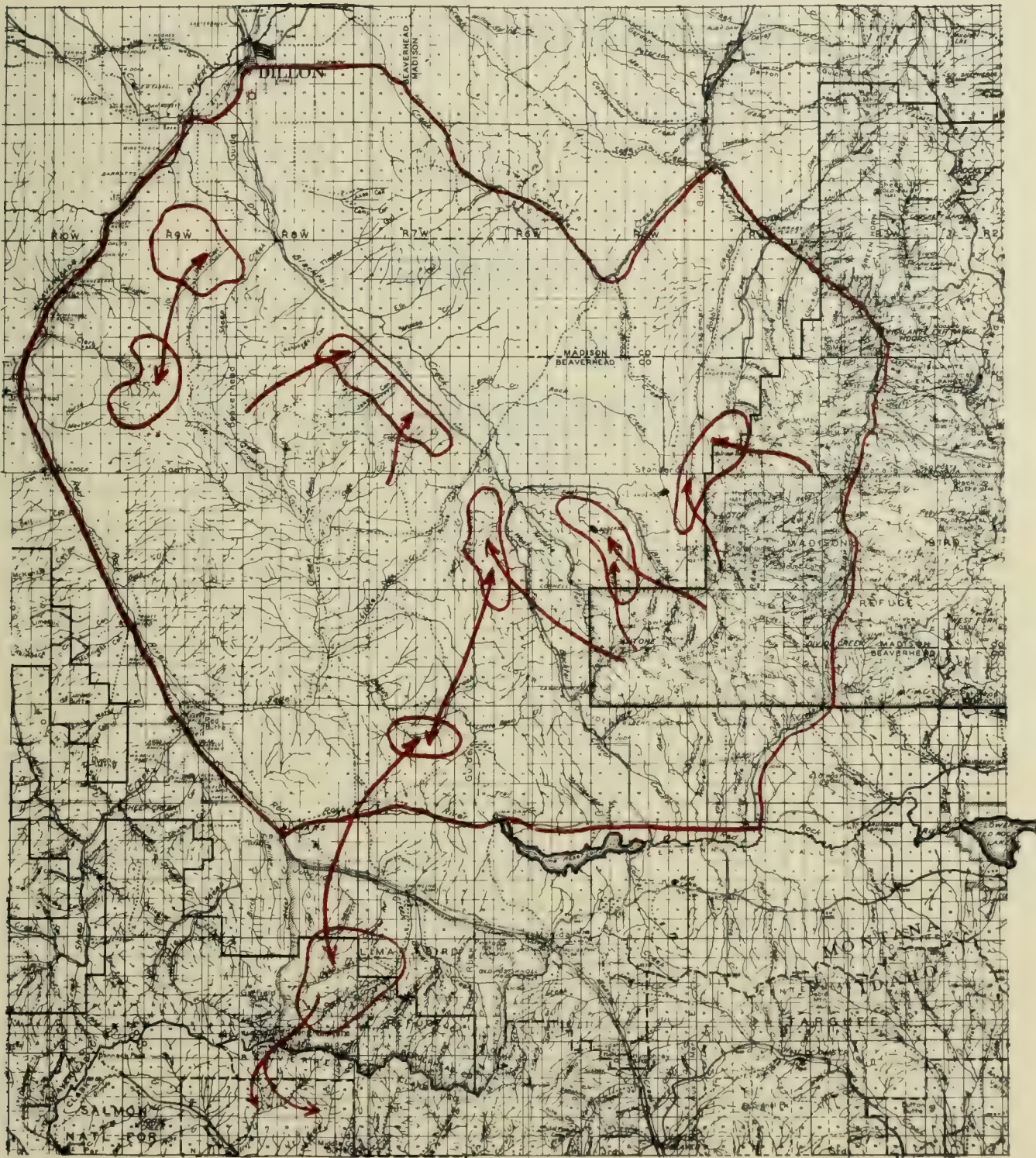
It is also recommended that a tagging program be initiated so that definite information can be obtained about the migration routes of these elk to their respective summer ranges. It is suspected that this migration pattern will be somewhat complicated. Ear tagging would definitely help in acquiring this essential information.

Submitted by:

Richard L. Hodder, Fieldman
Wildlife Restoration Division

April 17, 1948

Madison-Ruby Big Game Winter Survey



10

Proposed Boundary of Hunting Area
Elk Winter Range

STATE Montana

PROJECT 1-R (Western Montana)

DATE July 15, 1948

MADISON-RUBY UNIT

BIG GAME WINTER SURVEY

1947-1948

June 8, 1948

Submitted by:
Richard L. Hodder, Fieldman
Wildlife Restoration Division

TABLE OF CONTENTS

	<u>Page</u>
INTRODUCTION.	206
Explanation of a Management Unit.	206
Description of Madison-Ruby Management Unit	206
PROCEDURE.	207
GAME STUDIES.	209
Elk.	209
Blacktail Creek Game Studies.	209
Tobacco Root Elk Herd.	222
Ruby River Elk Herd.	224
Deer.	226
Ruby River Deer Herd.	226
Antelope.	237
Sweetwater Basin Antelope	239
Blacktail Creek Antelope.	240
Sage Creek Antelope.	242
Waterloo Antelope.	242
Moose.	244
SUMMARY.	244
Blacktail Elk Herd	244
Tobacco Root Elk Herd	245
Ruby River Elk Herd.	246
Ruby River Deer Herd.	246
Antelope.	247
Sweetwater Basin Antelope.	248
Blacktail Creek Antelope.	248
Sage Creek Antelope.	248
Waterloo Antelope.	248
Moose.	249

(Continued)

TABLE OF CONTENTS (Continued)

	<u>Page</u>
Picture - U. S. Forest Service Sno-cat used during moose studies in Ruby River Country.	210
Pictures - Aerial view of elk in Blacktail drainage during census flight of February 6; and Aerial view of Blacktail Creek elk taken on April 1, 1948.	217
Map - Elk Winter Range, Proposed boundary of hunting area.	218
Map - Ruby River Deer Units.	233
Pictures - One of the many coyotes killed by 1080 poison in this Ruby River Area; and This old deer carcass is typical of the fatalities in this area in that it has not been touched through- out the winter except by magpies and an occasional eagle.	236
Pictures - Antelope as seen from pickup in Sweetwater Basin; and Antelope viewed from air during aerial census.	241

MADISON-RUBY MANAGEMENT UNIT

BIG GAME WINTER SURVEY

1947-1948

INTRODUCTION

Explanation of A Management Unit

In order to facilitate the study and practice of effective game management, the State has been divided into logical Big Game Management Units. These management units were designed to encompass whole herds, if possible, of the various big game species. The natural boundaries of these management areas, then, are primarily limited to mountain ranges and major rivers.

These large management units are again divided into minor sub-units, each of which is identified by a number within the major unit. These sub-units facilitate the locating of projects, game damage to private property, etc.

Description of Madison-Ruby Management Unit

Location - The Madison-Ruby Game Management Unit is located in southwestern Montana and is delimited by the Continental Divide on the south, by the Beaverhead and Red Rock Rivers on the west, the Jefferson River on the north, and the Madison River on the east. The area included within these boundaries is approximately 4,200 square miles. The most important game areas in this extensive territory are found in the drainages of Blacktail Creek, the Ruby River, and Sweetwater Creek.

Topography - The topography of this area is largely mountainous with the Red Conglomerate Mountains, part of the Continental Divide, forming the southern boundary of the area. The unit also includes the Blacktail Range, the Snowcrest Mountains, the Gravelly Range, the Tobacco Root Mountains and the Sweetwater Hills. Valleys between these mountains are composed principally of dry, rolling bottomlands, much of which is excellent antelope range.

Vegetation - Vegetation in the area is variable. The timber types in the mountainous areas are primarily Douglas fir, with considerable lodgepole pine at the lower elevations. Principal browse species are sagebrush, rabbit brush, mountain mahogany, willow and some juniper. Needlegrass, bluebunch wheatgrass and fescue make up the dominant grass cover. The grass types naturally include a wide variety of both palatable and unpalatable forbs.

Climate - Climatic conditions in the various sub-units of the management area are variable, even at comparable elevations. For instance, the Blacktail drainage during a typical winter is relatively free of heavy snows to considerable elevations whereas the Ruby River drainage on the opposite side of the Snowcrest Mountains receives considerable snowfall during the usual winter to relatively low elevations. Climatological data pertaining to this unit and its sub-units are obtainable from the U. S. Forest Service records and from the Weather Bureau of the U. S. Department of Commerce.

PROCEDURE

This Madison-Ruby Big Game Management Unit was one of three

similar units to be investigated during the winter months of 1947-1948 by this crew. Up to this time, these three units in southwestern Montana have received little attention as management units in their entirety, and so it was left largely to the discretion of the crew as to what game problems demanded intensive study and concentration. It was projected that these studies include a comprehensive check or inventory of the various big game species and the relative abundance of each so that more intensive studies may be planned where needed and so that more effective management practices could be instigated.

Two men, Richard L. Hodder and Eldon Baker, were assigned to the areas mentioned above as the Beaverhead Big Game Crew. Field work began on November 12, 1947, and continued through the winter until May 15, 1948. The early part of the winter was spent largely in familiarizing the crew with the country and with the game problems most evident. The local Game Warden, the U. S. Forest Service and the Beaverhead Sportsmen's Association all were contacted frequently. Their ideas and opinions were found extremely valuable in setting up a plan for the winter program. In following through with this plan, this game crew traveled approximately 9,500 miles by car and considerable distance by snowshoes, walking and by snowsled and snowcat.

During these travels, all factual data pertaining to game animals and to the condition of the game ranges were recorded in an effort to obtain sufficient first-hand information on which to build a management plan.

GAME STUDIES

ELK

BLACKTAIL CREEK GAME STUDIES

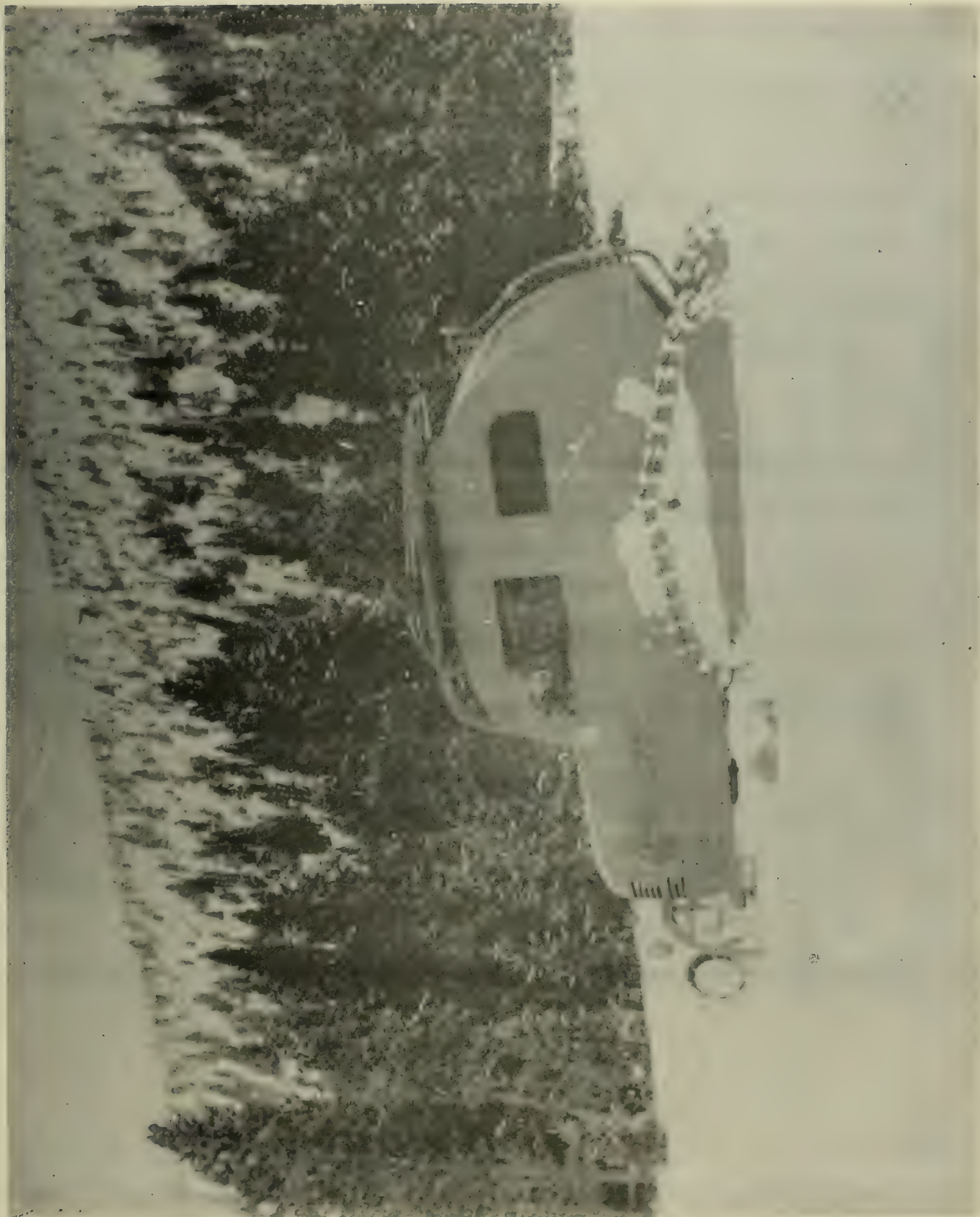
Sub-Unit #3

Description of Area

The Blacktail Creek drainage is located entirely within the Madison-Ruby Big Game Management Unit in Sub-unit #3. This drainage is bounded by the Blacktail Mountain Range on the southwest, and by the southern end of the Sweetwater Hills on the northeast. The source of Blacktail Creek is located high in the Snowcrest Mountains to the southeast with the Creek flowing in a northwesterly direction emptying into the Beaverhead River at Dillon.

The valley bottom is used largely for growing both wild and cultivated hay for feeding cattle and sheep on the large, but relatively few, ranches in the valley. The Sweetwater Hills forming the northeast side of the valley are rough broken hills on the lower end with mountain mahogany, sage and grass growing up to the lower timber-line. The higher end of the Sweetwater Hills is a sloping plateau, broken by occasional washes and deep gullies. The vegetative type here is sage, usually with considerable expanses of open grass at the higher elevations.

The Blacktail Mountains on the opposite side of the valley are covered on the top and on the sloping sides with grass and sage. In the steep, rocky central sections of the range, the sides of the mountains are timbered down to the alluvial fans formed on the valley floor. Steep canyons and gorges characterize this section, but on both



U.S. Forest Service Sno-Cat used during Moose studies in Ruby River country.

ends of this range there are several roads leading to the grassy, rolling tops of these mountains to join the maze of sheep roads that come into the area from the Sage Creek side.

Blacktail Creek heads in the rugged Snowcrest Mountains which separate the Blacktail and the Ruby River drainages. These mountains are high and do not have any roads passing through them. There are, however, several roads that run considerable distances up the East Fork of Blacktail Creek, up the Middle Fork of Blacktail, and up the West Fork to the Antoine Ranger Station and over the Clover Divide into Centennial Valley. A road also runs over the Sweetwater Divide into Sweetwater Basin.

History of Game in Area

The Poindexter and Orr Livestock Company was perhaps the first outfit to run cattle in southwestern Montana. These operations began sometime before 1870 and centered in the Blacktail drainage near Dillon. In 1876, this outfit pushed cattle over the Clover Divide from the Blacktail into the valley of Red Rock River. Because this movement was in the centennial year, 100 years after the Declaration of Independence, the valley was named Centennial Valley.

Mr. Ernest Orr of the old P. & O. Ranch was contacted for his views and recollections of game and game conditions in the area in early times. Mr. Sam Freeman, a rancher in the Sheep Canyon area of the Blacktail since 1880, was also contacted. These impressions were combined to paint a vivid picture of an area abundant with game.

Buffalo were not uncommon in the area before settlement of the white man, as is evidenced by the many old buffalo skulls that have been

found in the area. Mr. Orr related that the buffalo were herded out of the area or killed by the Plains Indians who tried to starve the Indians of this region during their many wars. Elk also were common in the Black-tail Range in very early days. Mr. Freeman tells of piles of bleached elkhorns up Sheep Canyon. These elkhorns were collected and piled by the Indians near their camps. These elkhorns are still in this area and remains of the Indian Camps are evident nearby.

During the Lewis and Clark Expedition, in the early 1800's, the explorers found little game in this locality according to their journal. Two deer were killed in the vicinity, but no mention of other game was made. Sacajawea, the Indian Guide, told of the hardships of her people in this area in obtaining sufficient food to sustain themselves and how her people were forced to go out on the Plains far to the east in search of buffalo where they were continually subject to attack by Plains Indians.

As late as 1883 mountain sheep were by far the most abundant of game animals in this area. These huge herds evidently developed after the Indians were forced to leave this territory either in search of better hunting grounds or because they were driven elsewhere by their enemies. Mr. Freeman says that in 1880 when he first came to this vicinity there were "loads" of mountain sheep in around Small Horn and Sheep Canyons. They used to range in large concentrations on the flats which are now above the P. & O. sheds.

Mountain sheep remained the staple diet of the Freeman family until around 1884 when the sheep were infested with scabbies. This disease introduced by domestic herds caused them to die off within a

relatively short time. There were very few hunters in the area at that time and so the disappearance of the sheep is not blamed on hunters, but on disease. It is interesting to note; however, that while the railroad was being built, carloads of sheep were brought down to feed the railroad crews as the meat was considered most palatable of big game.

With the scabbies infection of the mountain sheep, Mr. Freeman says that his family then turned to deer hunting. There were many deer in the area, but sheep were more abundante. Antelope, although numerous, were seldom taken for food because they did not come over this side of the hills from Sage Creek very often.

During the intervening years after the sheep disappeared, antelope in the area followed suit. Antelope were said to have been winter-killed due to a shortage of feed caused by the excessive use of the antelope winter range by domestic sheep herds. Antelope disappeared from the drainage entirely, but lately those few antelope that survived in the Sweetwater country to the north have reseeded the Blacktail and Sage Creek drainages again.

Deer in the area were reduced to a very low population, but because of the buck law numbers have increased throughout the drainage so that fair hunting is now possible.

In 1937, the Beaverhead Sportsmen's Association planted elk in the Blacktail drainage. According to information received from Pete Westergard of Dillon, about the planting of elk by the Association, there was a total of 113 elk shipped by truck from Yellowstone Park. Eighty-seven arrived at the mouth of Sheep Canyon, the point of release; one truck was "lost" and was unloaded near Lima. Of the 87 elk arriving on

the Blacktail, there were 5 fatalities in transit leaving 82. Among the 82 there were 13 bulls in the shipment which left a breeding stock of 69 providing they were all capable of reproducing. This is extremely unlikely, however, for the 69 probably contained some old unproductive cows and cows not yet of breeding age. By using this figure of 69 head, compounding it over a period of ten years at a yearly rate of increase, the normal being close to twenty per cent, indicates that the progeny of this planting plus the elk planted might now total about 430 elk.

It was agreed upon at the time of planting that no elk season would be opened in this area until ten years had elapsed from the time of planting. Now that this time limit has passed, there is a general movement by many people in this community to have some kind of an elk season in the Blacktail. This movement began last year, at which time, it was agreed upon by the Beaverhead Sportsmen's Association to request a season for the taking of 50 branch-antlered bulls. This request was received by the Game Department, but too late for action to be taken.

It was thought that since this elk herd had attracted the interest of so many people in the vicinity, and since it was apparent that a season would again be requested by the Beaverhead Sportsmen's Association, that an intensive study of the situation here was feasible so that the Game Department would have reliable information on which to base intelligent decisions and management practices for a series of successful hunting seasons.

Considerable time was spent throughout the winter observing the location of the larger groups of elk in the lower Blacktail. These numbers

and locations were recorded along with information collected from local ranchers about the larger groups of elk located further up the valley in the more inaccessible areas. This gave the crewmen a definite idea as to where to look for elk during the proposed census flight. A successful attempt was made to engage a pilot familiar with the valley and with the elk wintering areas in this drainage, for considerable time could be saved and at the same time many more elk could be found with a pilot who knew the country.

On February 6, 1948, Mr. Herbert Mace, a rancher on the Blacktail, and a competent pilot and owner of a Stinson Station Wagon airplane, agreed to fly the big game crew over the entire drainage to count elk in that area. Mr. Mace is very familiar with this country for he flies over it considerably. He has also made several personal counts of these elk, once with Deputy Game Warden Price.

The flight began from the Mace home ranch. The first area flown was the lower end of the Blacktail Range with the upper Blacktail following. Then the areas between the forks of Blacktail Creek were flown, and finally the area along the Sweetwater Divide including that high country at the head of Rock Creek, Robb Creek, and Ledford Creek. Small groups of elk which were easily distinguished were tallied directly from the air. Those larger groups on which a fast accurate count was impossible were photographed from the plane. Later these pictures were projected and enlarged, and the elk carefully counted. By the combination of these two methods, the census figure was reached.

Findings

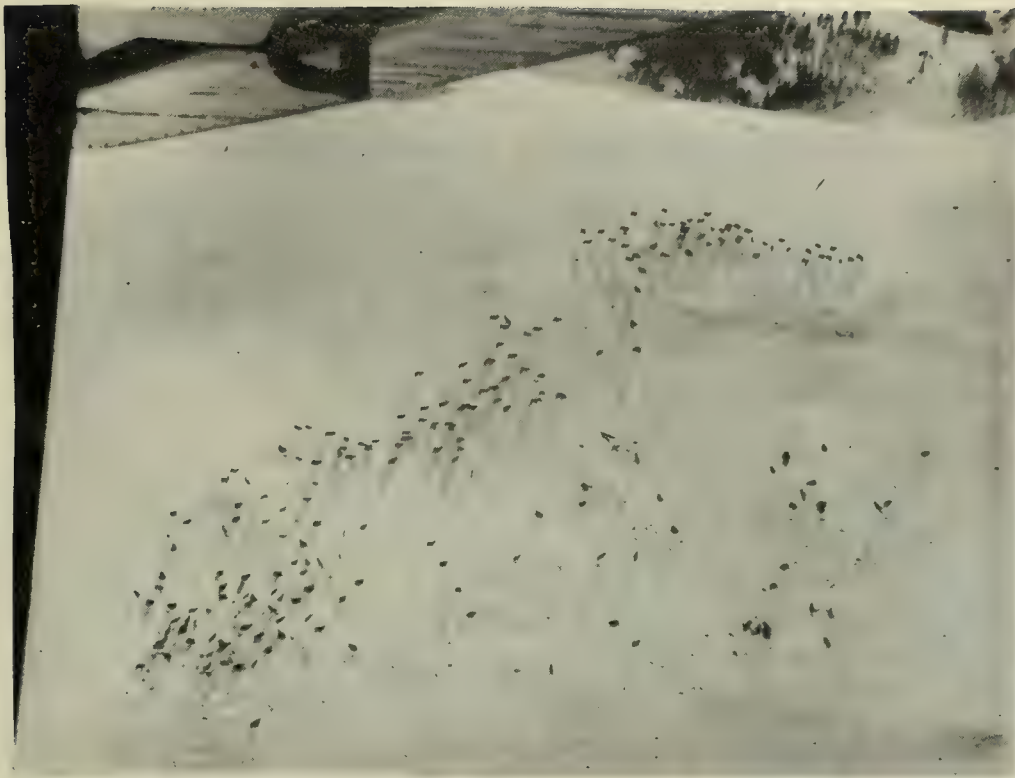
A total of 993 elk were counted in the area delimited on the

accompanying map. One crew member counted 1,004 elk while the other saw a total of 993. Because of this difference, the more conservative number of 993 is used.

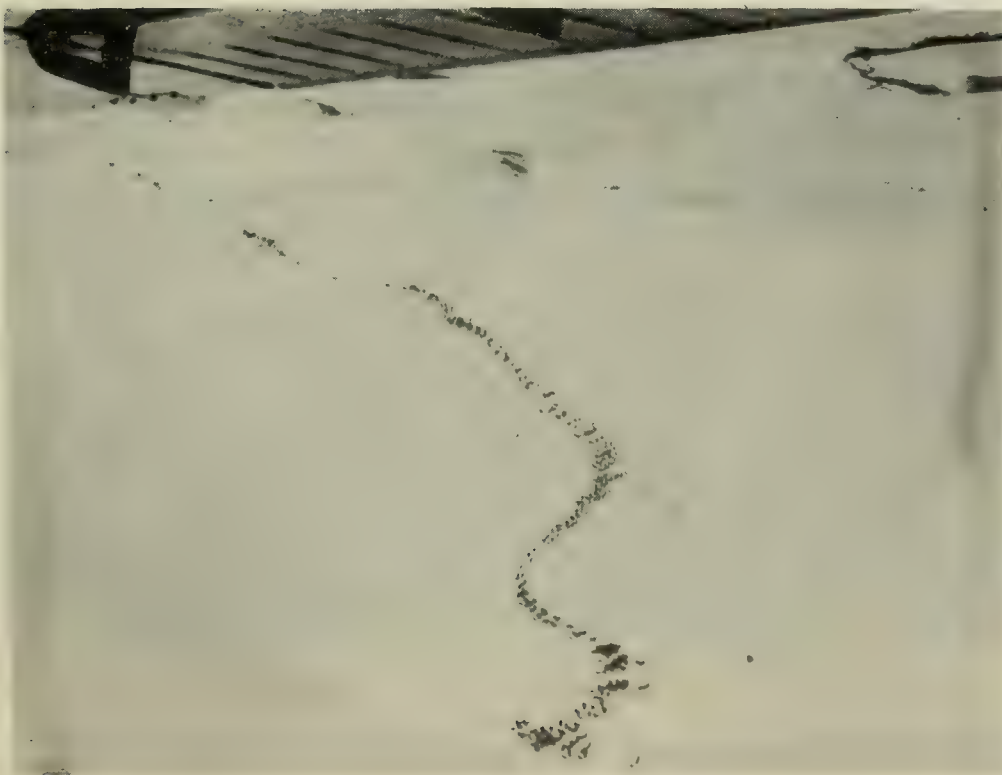
Distribution of elk ranged through the entire Blacktail Range to Prices Canyon. Large groups were seen in the hills between the Middle Fork and the West Fork of Blacktail Creek, and more between the Middle and the East Fork. Elk were also counted in the hills at the head of Rock Creek and Ledford Creek.

Many more elk were seen wintering above the Blacktail Range than in the range proper. Since the elk planted in this area are considered resident elk and are there all year, it is indicated by large herds outside that the progeny of the Beaverhead plant is a minor part of the elk wintering in the Blacktail drainage. These other groups of elk evidently summer in the mountainous country at the head of Blacktail Creek around the Notch and Antoine Peak. They may migrate through the Snowcrest Mountains, cross the Ruby River into the Gravellyes. Some of them summer over near the Clover Divide by Centennial Valley. There is a suspected migration across the highway below Lima where forty head were seen crossing the road near the beacon light from the Red Conglomerate Mountains.

It was attempted to count all elk in the Blacktail drainage during this flight, however, it is known that there are substantial numbers of elk wintering in areas adjacent to the Blacktail which were not included in this count. For instance, there is a group of elk that have been close to the two dark buttes northeast of Lima throughout the winter. These elk have been seen regularly by the Government trapper in that area, Bill Schmuck. There are approximately 90 elk in this group.

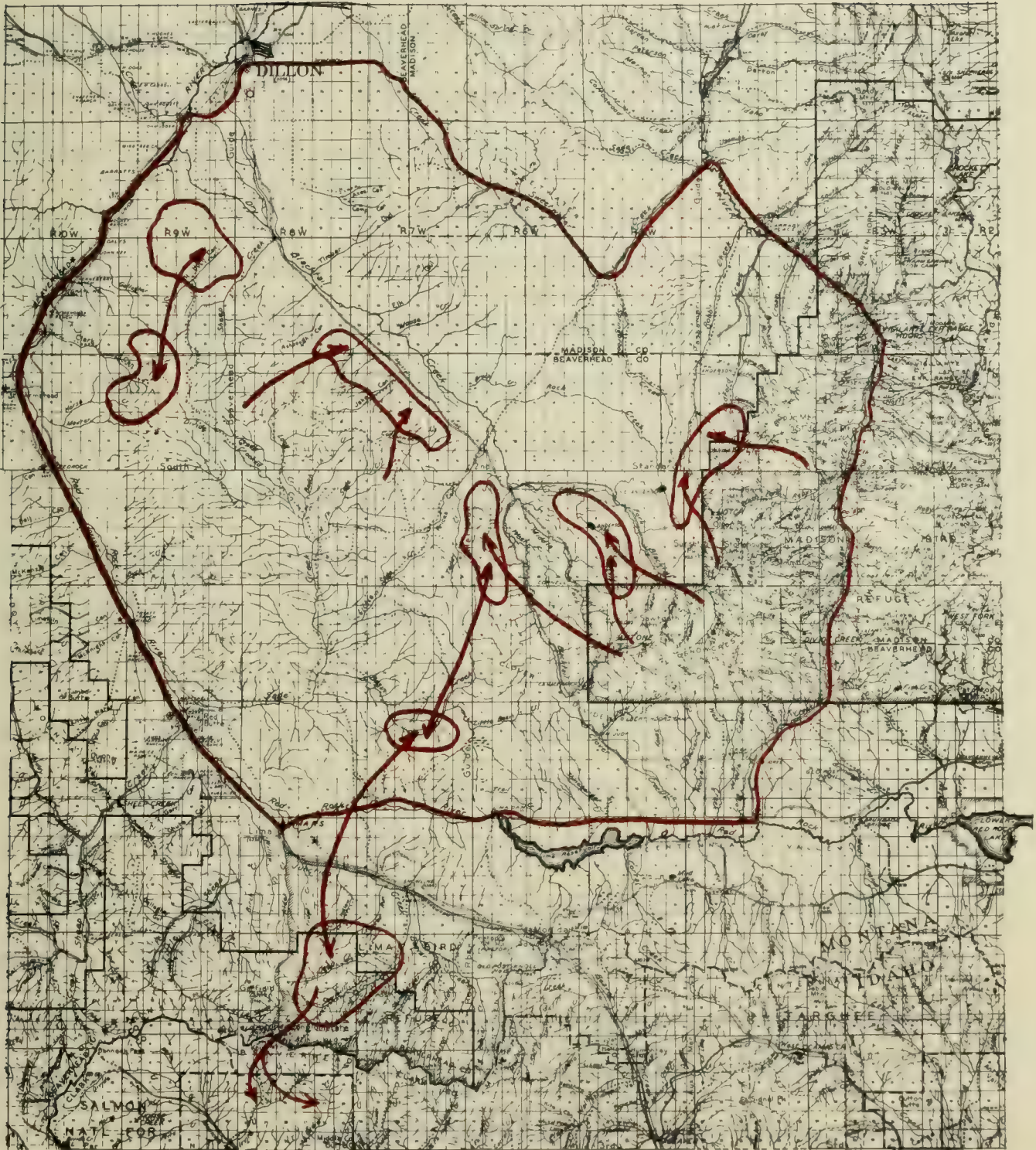


Aerial view of elk in Blacktail drainage
during census flight of February 6, '48.



Aerial view of Blacktail Creek Elk
taken on April 1, 1948

Madison-Ruby Big Game Winter Survey



Proposed Boundary of Hunting Area
Elk Winter Range



Recommendations

It is recommended that studies on this herd be continued throughout the coming spring and summer. A careful reconnaissance and range inspection should be made of the areas where the major parts of this elk herd have concentrated through the winter. These areas are indicated on the accompanying map. The analysis of range condition in these generally selected sites should indicate whether this herd has already reached its optimum number for the feed available in these selected feeding areas. It is recommended that numbers be limited largely to the carrying capacity of the winter areas chosen by the elk themselves. It is the opinion of this game crew that regulating numbers of elk by the carrying capacity of the winter range that could be used by elk in an area is an error which will surely lead to difficulties. If this herd is allowed to increase to the capacity of the winter range available, those few selected spots will be so abused that damage will be evident.

A careful study of the range conditions by representatives of the U. S. Forest Service, of the Beaverhead Sportsmen's Association, Fish and Game Department, and other interested agencies, as well as those ranchers upon whose land this herd winters, will formulate a workable management plan. The proposed limitation of elk numbers determined by all groups concerned may be brought about which will produce a game crop to be harvested annually, and at the same time provide adequate feed and ground cover to protect other interests.

Because there have been reports of damage to private property by elk this year for the first time, it is indicated that this herd might already have reached beyond its optimum development unless artificial means of management are brought into use. It is felt that these means;

such as, herding and feeding, are undesirable. If an over-abundance of elk is allowed to develop in this area, sooner or later it will be necessary to reduce the number to what the range which the elk care to use will support, or the elk will migrate to new feeding areas to suit their choosing. The problem is already familiar to most all agencies managing big game.

It is recommended that a limited license season be opened for the taking of 150 branch-antlered bulls during a special season following the coming regular elk season this fall. This late season will allow most livestock to be removed from the range before the season begins. A kill of 150 bull elk is suggested because the annual increase of the elk counted during this census should be approximately 200 head. Because there has been no hunting season initiated in this area to date, there is a large percentage of bulls in the herd, some of which could be removed without materially affecting the annual estimated increase. If it is found by future range studies that this herd has developed an optimum population, the take during the next few years should be so regulated as to provide the desired number.

It is suggested that an aerial census be conducted each year for several years, at least, as a part of the studies of this herd so that a more substantial and reliable picture of this group of elk can be developed.

The boundary of the hunting area for the proposed season is recommended as follows: Starting from Dillon, follow the Sweetwater Road to the Ruby River, thence up the Ruby River to Long Creek, thence down Long Creek to the Red Rock River Road, thence down the Red Rock

River Road to Lima, thence down U. S. Highway #91 to Dillon. This suggested boundary necessarily includes much territory in which there are no elk, but it is a permanent tangible line around the area.

For the most part, this country in question is extremely accessible as there are roads from all sides leading into it. It is almost entirely open country. There is little of it that cannot be covered by Jeep. A general open season might make it possible for elk in the lower Blacktail to be cut off from their natural escape route and be slaughtered. If this were to happen, it would naturally defeat the purpose of the season entirely.

With unlimited hunters in the area, and if the escape route of the elk were not blocked, the harassed elk would have little choice but to head for the upper Ruby country where they would be outside of the hunting area.

Practically all of the hunting area in question is owned or leased by a small number of ranchers. Unlimited sportsmen in the area would most likely create hunter damage in excess of elk damage, for to date, elk damage has been light. As these ranchers are businessmen, it is only logical to assume that if damage to their property will be less by not having hunters in the area, they will post their holdings to NO HUNTING. If this were to be the case, the purpose of the hunting season would be lost completely.

It is also recommended that a tagging program be initiated so that definite information can be obtained about the migration routes of these elk to their respective summer ranges. It is suspected that this migration pattern will be somewhat complicated. Ear tagging would

definitely help in acquiring this essential information.

Other groups of elk in the Madison-Ruby Management Unit are of a minor nature compared to the Blacktail herd, still they are not so insignificant as to be overlooked.

TOBACCO ROOT ELK HERD

Sub-Unit No. 3

According to information received from Bill Schowey, Forest Service Ranger of Sheridan, this elk herd was planted and supplemented by the Rocky Mountain Sportsmen's Association. All elk were released in the vicinity of the A. J. Davis Ranch. The original plant consisted of 33 head from Yellowstone in February of 1939. This plant was supplemented in 1942 with the shipment of two more loads of elk of 18 each, one arriving on February 2nd and the other a week later on February 9th.

An attempt was made to obtain the ages and sex of the elk planted in the area, but this data was not available.

In 1946 a five-day open season was declared for the taking of elk of either sex in this area. The local sportsmen's club, the Madison County Wildlife Association, wrote to the Fish and Game Department and expressed their opinion stressing the danger that a five-day season might exterminate such a small group of elk. Because of the views expressed by this Association, the elk season was reduced to a one-day season on both sex.

According to Ranger Schowey, most of the elk had drifted south toward Sheridan from where they were planted. Approximately 125 elk were found in the area of Nugget Gulch when the season opened. This number

was considered the best part of the herd which had developed from the 69 planted. During the one-day of hunting, about 65 head of elk were killed in the Nugget Gulch area. Most of the remaining elk were driven out of the country back toward Twin Bridges to the locality of the Davis Ranch where they were originally planted. Twelve head were known to have been pushed up Mill Creek to Quartz and Legget Creeks.

Ranger Schowey estimates that there are at present possibly 10 head of elk left in the area northwest of Sheridan on his district. During the winter, no elk were seen on the Beaverhead Forest in this area by this game crew. A report was received of elk being seen on the Dry Georgia Creek area, but upon investigation, no elk or elk sign was found, in the country from Dry Georgia south to Mill Creek. Miners in the area were contacted, but none had seen any elk this winter where they had seen them during previous seasons.

Mr. Clark Hall, a pilot at Sheridan Airport, reported seven head of elk on Sand Coulee southwest of Sheridan on March 4th as the only elk seen during his frequent flights over the Twin Bridges-Sheridan area this winter.

Recommendations:

Ranger Schowey suggests that a season be held on elk in this area every three or four years in order to hold down the elk numbers to what can safely sustain themselves on the small amount of forage allowed and still provide good hunting. He estimates feed for about 100 head on his district in this area.

It is the general concensus of opinion in the area to have an open season on both sex occasionally to provide fair hunting and good

meat rather than an annual season for bulls only.

It is recommended by this crew that there be no regular elk season in this area for several years. Special seasons might be found necessary if probable damage to private property cannot be alleviated by fencing and if manipulation of the herds and their movements can be effectively handled by this method.

RUBY RIVER HERD

Sub-Unit No. 3

Mr. Lawrence Schultz, Government Trapper of Sheridan, was contacted for any information and personal observations of game in his territory. He reported the absence of a group of some 75 elk that usually winter at the head of Robb and Ledford Creeks on the west side of the Ruby River area and the presence of a group of some 200 elk in a new location on the east side of the Ruby River in the Timber Creek-Powder Gulch area in the vicinity of the Canyon Camp ground. This group he thought was part of the Blacktail elk.

During the Blacktail aerial census, it was found that a group of 55 elk was wintering at the head of Rock, Robb, and Ledford Creeks. A group of approximately 75 has wintered in this area for the past several years according to Nick Birre, a Sheridan sportsman.

Several investigations were made on the east side of the Ruby River in an attempt to find the 200 head of elk of which Mr. Schultz spoke. On Thursday, December 18th, while studying this area, one bull elk was seen in Powder Gulch. Three cows, three calves and one spike were seen in Ice Creek. On Willow Creek 12 cows and 6 calves were seen -- one elk carried a cow-bell on its neck. On Friday, December 19th, 5 elk, 1 calf,

3 cows and 1 spike bull were seen on South Fork of Greenhorn Creek.

Later in the season on February 9th, two bulls were seen in Martin Gulch south of the Vigilante Range Experimental Station. On February 11th, 46 elk were seen in the area between Powder Gulch, Ice Creek, and Bone Hollow. An intensive re-check was made for elk in this area with Alternate Ranger Ronnald Schultz of Sheridan in early March. On this trip a group of 47 cows and calves were counted bedded on an open hillside in the Ice Creek-Bone Hollow area. Some elk located in the timber next to this herd could not be counted. Several bull elk were seen during this investigation and considerable sign, indicating that there might be a possible 75 elk in the entire area.

Unlike Mr. Schultz, it is the opinion of this crew that these elk are not part of the Blacktail herd, but rather part of the rapidly increasing group of elk that has been wintering on the east side of the Gravelly Range in the vicinity of the Wall Creek Ranger Station. These elk might have been forced into this area by the hunting pressure created late last fall on the Madison side of the range during the extended deer season.

Recommendations:

It is recommended that the group of elk wintering at the head of Rock, Robb and Ledford Creeks be included in the Blacktail hunting area. This small group of elk has caused some damage to late harvested grain crops on the Upper Gilbert place last fall. Including it might alleviate the recurrence of this damage and the necessity of a special season, and at the same time it would cause the boundary of the Blacktail hunting area to extend to the Ruby River on the east, thereby including a large

percentage of elk in the Snowcrest Mountains, which would not be included otherwise if the line were to be the road along the West Fork of the Blacktail. The limited kill proposed for the Blacktail elk herd was based on the inclusion of the Snowcrest Mountain elk wintering in the Blacktail drainage.

The elk appearing this year in fair numbers on the east side of the Ruby River should be included in the investigations following the either sex deer season scheduled for next fall. Their movements should be watched carefully when the hunting pressures on both sides of the Gravelly Range are equalized by simultaneous late deer hunting seasons. At present, these elk are in an area where they can do practically no damage to private property and where their presence are desired.

DEER

RUBY RIVER AREA

Sex Ratio and Fawn Crop Studies:

Deer problems in sub-unit 3 of the Madison-Ruby Management Unit are limited almost wholly to the Ruby River drainage. Here a serious trouble spot was recognized. Both the U. S. Forest Service and the Game Department have been keeping an eye on this area because of the large concentration of deer wintering in the drainage during the last few years, and because of the resulting damage to the natural winter range.

Studies were carried on in this area throughout the winter months for the purpose of gathering information and data on the numbers and trends of the deer population including the sex ratio and the doe-fawn ratio.

This information when applied to the problems created by this deer herd should help forecast the rate of development of this herd, and should show the effects and results of past management practices. In the same manner, it should indicate and suggest measures necessary for more feasible management in the future, for the problems of holding this deer herd in proper sexual balance, of reducing the herd to the optimum number for which there is adequate winter range thereby eliminating much of the destruction of private property, are major problems indeed.

The country referred to in this report is located in the Madison-Ruby Big Game Management Area in sub-unit No. 3. It borders on both sides of the Ruby River from the Cottonwood Camp on the south to the Greenhorn Creek drainage on the north and a distance varying between one and three miles in an easterly and westerly direction, depending on the topography of the hills bordering the River. The country within these boundaries is composed of rough broken hills extending back into the Gravelly Mountains to the east and into the north end of the Snowcrest Mountains on the west. The hills are steep, usually timbered on the northern exposures and covered generally with a mountain mahogany vegetative type on western exposed sides. Considerable open grass areas, many of which extend up over the tops of these hills, are found on the southern exposed faces.

At the time of this survey, there was snow in the area, but since this is extremely windy country, most of the open areas were relatively bare, even on the higher slopes.

Until recently, this herd has not created any pressing problem. Deer numbers have increased steadily in this area for a number of years

under the protection of both ranchers and sportsmen, but now damage is being done to both private property of local ranchers and to the vegetation on the winter range.

It is thought by many people, including Deputy Game Warden Kohls of Ennis and Ranger Schowey of Sheridan, that many of these deer are driven into this area to winter by the hunting of does on the Madison side of the Gravelly Mountains. This extended season following the regular season drives the deer high into the mountains where feed is usually well covered by snow at this time of year. In just a short distance out of this hunting area over these low mountains, deer can find a haven in the upper Ruby Valley. This probable influx might explain the sudden increase of deer in the last few years in this area which was already reaching its optimum population.

Ranger William Schowey of the Sheridan Ranger Station was contacted in order to help locate the area to be studied. Since it was known at the time of this survey that a deer census was to be made later in the season, it was thought advisable to limit the sex ratio and fawn crop study to an area which would be within the boundaries of the deer count area.

The section chosen as representative of the concentration area was located on the east side of the Ruby River, from the Vigilante Range Experiment Station as the south boundary, to Jasmine Creek on the north. This section was thought to give a truly representative sample of the deer population in the area because it includes the most important concentration area, and the terrain is most conducive to a successful deer sex ratio study.

This representative section of the concentration area was divided into units each of which could be methodically covered during the course of one day, yet be naturally bounded so that deer overflow from one unit to the next would be negligible. These units were decided upon as follows:

First day:

Davis Creek
Timber Creek
Schoolman Gulch

Second day:

Powder Gulch
Bone Hollow
Ice Creek
Willow Creek

Third day:

North and South Forks of Greenhorn Creek
Jasmine Creek

Each of these units was covered on foot. All groups of deer that were identified as to the number of bucks, does, and fawns contained therein were tallied. If a group of deer was not completely identified as to sex, then that group was disregarded entirely and was not included in the study because of the following reason. The very nature of a differential count such as this makes it imperative that all deer in a group be counted and classified if the data are to be representative of the deer population. It is but natural for nearly everyone, when classifying deer, to count the bucks in a group first, then perhaps the fawns, and lastly the does. If one had recorded the bucks in the group and was busy counting fawns when the deer in question ran out of sight, the numbers tallied would not be representative of the original group, nor of the deer population as a whole. Certainly a true sex ratio could

not be obtained if such figures were used. However, single deer, such as bucks found alone were included in this study since they materially effect the sex ratio during the period.

At this point, it might be well to say that the sex ratio of a population is that relation between the number of females and the number of males. This ratio is obtained by dividing the number of does by the number of bucks. The doe-fawn ratio is the relation between the total number of does to the total of fawns. This ratio is obtained by dividing the number of fawns seen by the number of does in the same area. The herd increase percentage is obtained by dividing the total adult deer into that number of fawns. The percentage of fawns is obtained by dividing the total population into the number of fawns.

A total of 657 deer were classified in groups in the above designated area. This total was composed of deer in the several units as follows:

Davis, Timber, and Schoolman Gulch Unit

Does	Bucks	Spikes	Fawns	Sex Ratio	Fawn Crop	Doe-Fawn Ratio
138	32	5	89	1:3.7	64.5%	1:65

Powder, Bone Hollow, Ice and Willow Creeks Unit

Does	Bucks	Spikes	Fawns	Sex Ratio	Fawn Crop	Doe-Fawn Ratio
80	10	6	72	1:5.0	90.0%	1:90

North and South Forks of Greenhorn and Jasmine Creeks Unit

Does	Bucks	Spikes	Fawns	Sex Ratio	Fawn Crop	Doe-Fawn Ratio
121	13	6	85	1:6.3	70.2%	1:70

Totals for Entire Area

Does	Bucks	Spikes	Fawns	Sex Ratio	Fawn Crop	Doe-Fawn Ratio
339	55	17	246	1:4.7	72.6%	1:73

Herd Increase 69.6%.

Percent of Fawns 37.4%.

Conclusions reached from this study indicate that this deer herd is sexually well balanced, and that the fawn crop is satisfactory, at least it compares favorably with many range lambing operations.

Census Studies:

Ranger William Schoway of Sheridan was contacted early in the season. He explained the method and technique used by the Forest Service in this area last year, the date of last year's count, and the area covered during last year's census. It was decided that it would be feasible to use the same method and the same area as was used before so that a true comparison could be made between the data obtained last year and that obtained this season. The census was conducted on approximately the same dates as during the previous year.

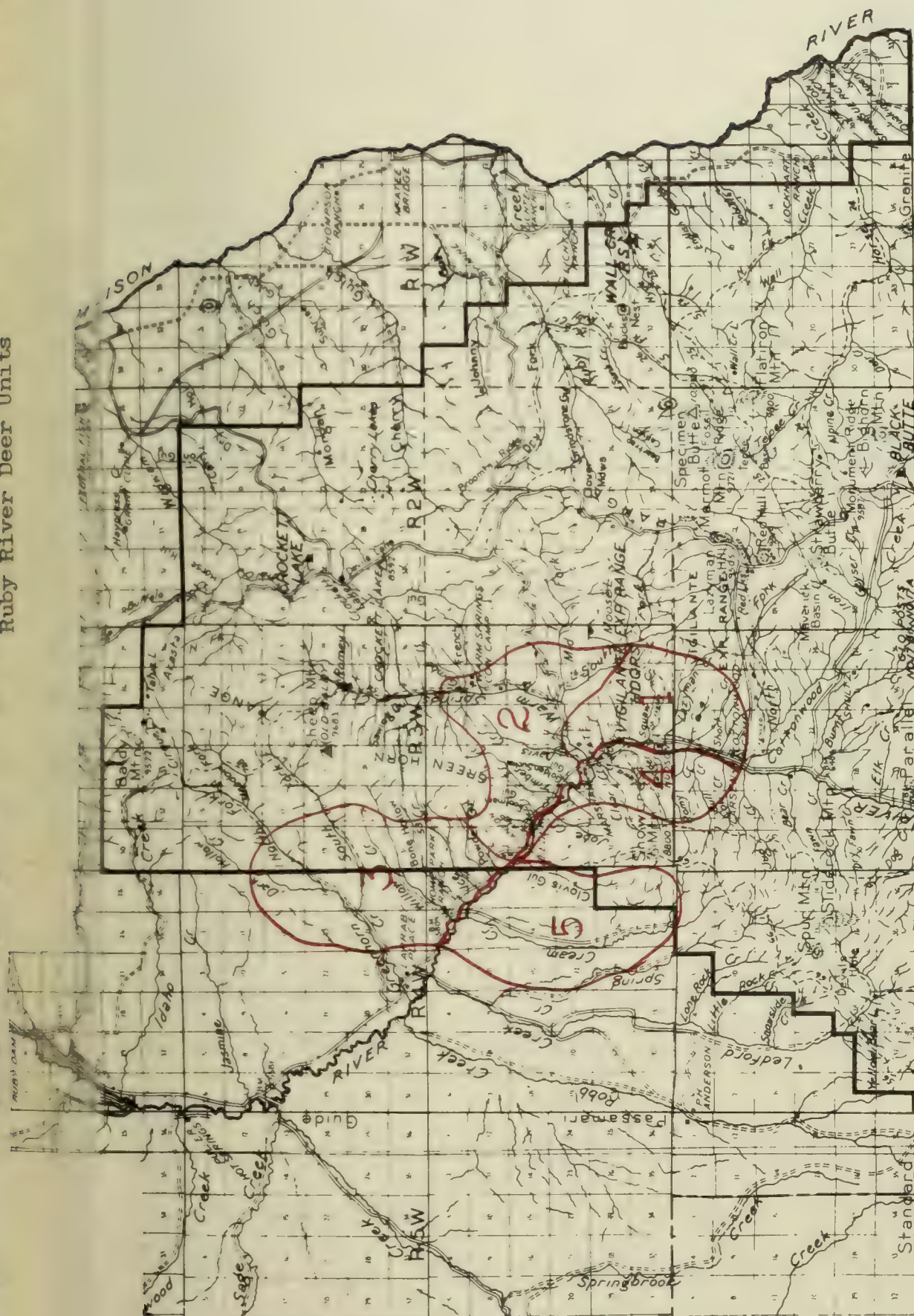
The area to be studied was divided into five units, each of which could be methodically covered by a team of two men during the course of one day, yet be naturally bounded so that deer overflow from one unit to the adjacent one would be as small as possible. These units are delimited on the accompanying map and are numbered 1 through 5 for ease in identification. Unit #1 is located on the east side of the Ruby River on the extreme southern end of the area surveyed. This unit starts at the Cottonwood Camp and extends down the River. It is bounded on the north by Warm Springs Creek and the South Fork of Warm Springs Creek. Unit #2 is bounded by Warm Springs Creek and the South Fork of Warm Springs Creek on the south and it extends down the River

to the Canyon Camp. Unit #3 is bounded on the south by the Canyon Camp-ground and terminates on the northern side of Greenhorn Creek drainage. Unit #4 is located on the west side of the Ruby River opposite Unit #1. It also is bounded on the south by the Cottonwood Camp and it extends in a narrow strip down the River to the Canyon Camp. Unit #5 begins at the Canyon Camp-ground and ends on the ridge between Cram Creek and Ledford Creek. This unit is composed largely of the Cram Creek drainage. In aggregate, these units outline an area of approximately sixty square miles.

Each of these units was covered on foot by two men working together. Non-adjacent units were worked simultaneously so that any overflow from one drainage would not be recounted in another by the other crew. In most cases, one member of a crew covered the country in the creek bottoms while his crew partner worked the higher country. The crewman at the higher level would then be in a better position to see deer on both sides and the bottom of the open drainages. The number of the unit, the name of the drainage, the time, and the number of deer in each group seen were recorded so that a check could be made for those deer that might have been counted twice, once by each crewman, and so be considered when totaling the figures. Classification of deer seen was not attempted as it was during the preceding census because at this time of year distinguishing does from bucks is questionable except at close range.

A total of 2,104 deer were counted in the area designated. The total of the census conducted one year previously was 1,724. This total was composed of the following sub-totals of the several units.

Ruby River Deer Units



Area	1948 Count	1947 Count	Difference
Unit #1	100	61	+ 39
Unit #2	384	467	- 83
Unit #3	1,206	788	+ 418
Unit #4	118	43	+ 75
Unit #5	296	365	- 69
Totals	2,104	1,724	+ 380

Recommendations:

Conclusions reached from this study and from observations of the vegetation on the winter range indicate that this deer herd has increased beyond the optimum number for the area usable as winter range and the herd is still increasing. The 1948 census shows an increase of 380 head of deer seen over that of the previous year.

Since coyote populations have been materially reduced throughout both the winter and summer range of this deer herd within the last few months, it is reasonable to assume that the fawn crop will be higher in the future than in the past and the death loss due to predators will also be reduced.

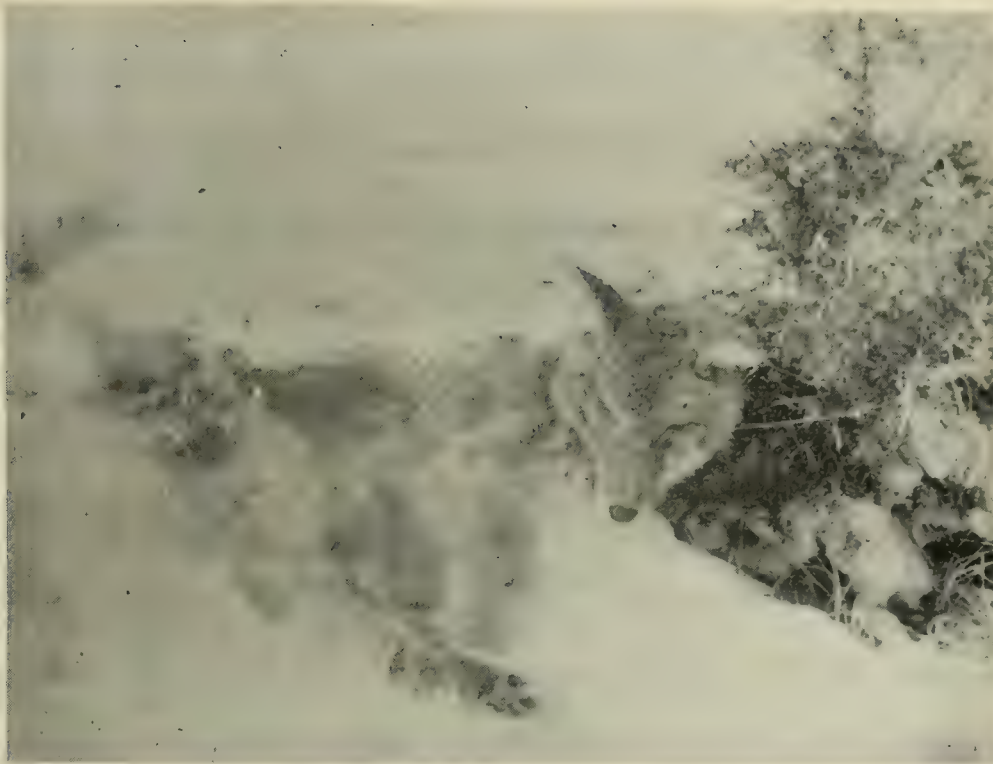
These facts lead one to anticipate a more rapid rate of increase of deer in this concentration area than heretofore unless the present number of breeding stock is reduced. Therefore, it is recommended here that a season on both sex be set for the coming hunting season for the taking of three hundred does. A kill of three hundred does, plus the

expected number of bucks will lessen the number of deer in this herd and reduce the increasing tendency of the herd to further out-grow its available winter range. This season should be set simultaneously with and in a similar manner as the season on the Madison side of the Gravelly Mountains so that hunting pressure will be equalized on both sides of the range throughout the season.

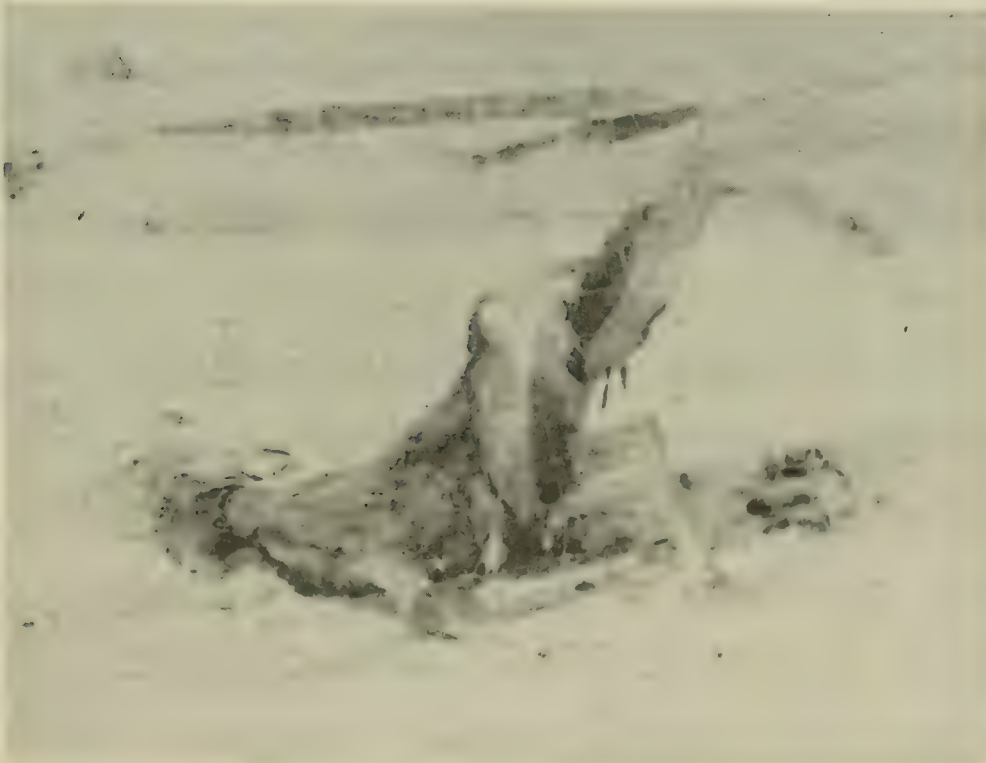
AREA TO BE HUNTED: Beginning at the mouth of Greenhorn Creek, thence up Greenhorn and the North Fork of Greenhorn to Baldy Mountain, thence along the divide in a southerly direction to Crockett Lake Ranger Station, thence along the Divide Road to the West Fork Ranger Station, thence down the road to the Ruby River, thence down the Ruby River to Greenhorn Creek, the point of beginning.

It is recommended that a checking station be operated by a competent and reliable man throughout the entire hunting season in order to obtain accurate information on the number, age, and sex of deer removed which will be essential data for the proper management of this herd in the future. It is further recommended that information on the weight, antler measurement, and other data be obtained at this station for research use by the Wildlife Restoration Division of the Montana Fish and Game Department. This information is obtainable only from checking stations during the hunting season. This work should be instigated in order to promote progressive studies in various phases of deer management.

The Upper Ruby Valley deer concentration area is unique in that its topographic features, vegetation, typical weather conditions, and deer population, make it as conducive to intensive continuous deer studies as



One of the many coyotes killed by 1080 poison in the Ruby River area. Only eagles and magpies remain to clean up carcasses as they are doing with this coyote.



This old deer carcass is typical of the fatalities in this area in that it has not been touched throughout the winter except by magpies and an occasional eagle. Heretofore, coyotes removed these carcasses almost overnight.

any area encountered in this part of the state. It is suggested that this area be investigated in the near future for the purpose of setting up long-time experiments and investigations in deer management upon which decisions, regulations, and management practices of more elusive herds may be based.

ANTELOPE

In sub-unit No. 3 of the Madison-Ruby Management Unit, there are three recognized herds of antelope with possibly a fourth developing. None of these herds were planted, but instead they have spread into the various areas from the Sweetwater Basin source, the only herd in the region that was not completely decimated in past years.

Thirty years ago, antelope were common in most of the sagebrush, grass types of vegetation around Dillon. Hunting was considered excellent. Mr. Ernest Orr an old timer intimately familiar with the Blacktail and Sage Creek areas recalls that in his younger days, antelope hunting was a popular sport. Because of the terrain and the seasonal migrating habits of antelope in the Sage Creek area, this country was the most popular antelope hunting spot in southwestern Montana. Huge herds that summered in the Centennial Valley migrated in the fall to the Sage Creek area to winter. These herds were intercepted in their movements by hunters, and considerable numbers were taken. It is Mr. Orr's opinion that although many antelope were killed by hunters, they could hardly be considered the major decimating factor in the elimination of the antelope from this range. Instead he seemed very definitely convinced that excessive over-grazing of the winter range by domestic sheep during the summer months left so little antelope

winter feed that what remained was not sufficient to sustain large numbers of antelope throughout the hard winters, and in a few seasons they were gone entirely. According to C. R. Price, Deputy Game Warden, Sweetwater Basin is the only area in which antelope were not eliminated in this section of the State. Here 5-6 antelope were all that he had seen for years.

Later, from these few antelope left in Sweetwater Basin, numbers increased under protection and antelope eventually migrated over the Sweetwater divide into the Blacktail drainage, then around the foothills of the Snowcrest Mountains and over into the Sage Creek country. Now, each of these sections is once again populated with permanent small herds. Sweetwater Basin still contains most of the antelope in this sub-unit - close to twice as many as the others combined. Sage Creek is next largest, for this country is very extensive and the limitations of feed and range are not so confining as in the smaller Blacktail area where but relatively few antelope winter.

Purpose:

The purpose of these antelope investigations was to make a count of the antelope in the units which generally comprise the antelope hunting area in southwestern Montana. This information may lead to more effective management plans and means of protection for newly planted herds in the area, and to a change of the hunting regulations in the area open to hunting as far as sex and numbers to be taken are concerned.

The description of the area open to antelope hunting in Beaverhead and Madison Counties is as follows: Beginning at Twin Bridges following

the road to Dillon, thence following Highway #91 to Monida, thence following the Red Rock Lakes Road to the road which runs northward between the Snowcrest and Gravelly Mountains, thence following this road down the Ruby River to Twin Bridges, the point of beginning. This area is open for the taking of one hundred buck antelope.

Herds included in the Madison-Ruby Management Unit are Sweetwater Basin, Blacktail Creek and the Sage Creek herds, all in sub-unit No. 3, and the Waterloo planted herd in sub-unit No. 1. All of these areas are typical antelope ranges in that they are composed of low, rolling hills covered with a mixture of sagebrush and grass types. The sage types are usually found at the lower elevations and the grass types on the higher hills and knobs. There is considerable variance in elevation in all of these areas providing range suitable for both winter and summer feeding.

Each of the areas mentioned were investigated first from the ground by truck or horseback and on foot, and later from the air. Local residents and sheepmen in the field were contacted in each area in order to help locate probable areas and the usual haunts where antelope might be found. These contacts were well worthwhile, for each of these areas contains considerable country in which the antelope may roam, and so the chances of finding many of them from the ground are somewhat remote. For the same reason, the probability of counting all of them from the air is also unlikely. At most, the figures included here are indications of the antelope populations and are not intended to be conclusive.

Sweetwater Basin:

On April 1st, 1948, a plane was hired from Butte, and was piloted

by John Fox. It was intended to cover all of the antelope country around Dillon to get an over-all picture of antelope numbers in this section during this flight.

Sweetwater Basin was the first area flown. For a time, no antelope could be seen anywhere, but after several passes over the area where antelope were seen on the preceding day, they came out of the sagebrush in the creek bottoms into view. Five hundred and ten antelope were seen from the air in this Basin.

On the previous day, more than three hundred antelope were seen here from the ground. Usually the groups of antelope found were composed of around sixty head making an accurate count difficult as they ran in a bunch past the pickup.

Sheepmen contacted in this area say that the antelope in the Basin oftentimes range as far over to the east as the bare hills between the Ruby River and Cream, Ledford and Robb Creeks. However, on investigation, no antelope were seen in this area.

Across the Sweetwater Hills west of the Basin on Carter Creek, a herd of antelope was reported by student flyers from the Dillon Airport. Upon investigation in this area, it was found that eighty-seven head had wintered close to a spring on the Dodd Ranch. Mr. Dodd says that the antelope are at his spring most every morning. He has counted eighty-seven in the bunch, but he estimates that there are about 105 in the group.

Further investigational work is necessary to determine the status of this Carter Creek herd as to its permanency.

Blacktail Creek - Sub-unit No. 3:



Antelope as seen from pickup in
Sweetwater Basin



Antelope viewed from air during
aerial census

Flights over this area were made on February 6th and on April 1st. No antelope were seen on either flight.

Mr. Herbert Mace, a rancher and pilot on Blacktail Creek, has flown over the area often and he reports seeing antelope in this area frequently throughout the winter. He has counted at least 44 in his wire pasture - an enclosure containing an area of twenty-two square miles. This enclosure is evidently a favorite haunt of this herd during the winter. Mr. Mace estimates that a good fifty head winters in the Blacktail drainage.

Sage Creek - Sub-unit No. 3

During the aerial survey on April 1st, 131 antelope were counted in the area between Little Sage Creek and the North Fork of Big Sage Creek. This is perhaps the most heavily populated section in this extensive antelope range.

Several ground checks were made in this area. The largest number of antelope seen in any one day was 106. These antelope were in small bunches of from 10 to 20 and were well scattered.

Antelope have been reported seen this winter from U. S. Highway #91 on the slopes of hills behind Armstead all the way to Dell and beyond. These antelope are usually in small bunches and well scattered just as those seen in Sage Creek.

Mr. C. R. Price, Deputy Game Warden, estimates that there are probably 250 antelope in the Sage Creek herd, about twice as many as were counted from the air.

Waterloo Antelope - Sub-unit No. 1

This small herd was planted in 1946 near the town of Waterloo in sub-unit No. 1 of the Madison-Ruby Unit. Two truck loads of antelope trapped near Toston were unloaded in this area. One load consisted of 18 and the other 13, totaling 31. Because of gas fumes from one of the trucks, seven antelope were asphixiated in transit, leaving a **total** of 22 planted antelope. The six surviving antelope in the truck load that was gassed were quite feeble when released and so could have been easy prey for coyotes in the region. This area was flown by this field crew on March 4th in a plane from Twin Bridges. No antelope were located from the air.

The largest group of antelope reported seen in this planted area was 13 observed from the air during a flight by Deputy Game Warden Carl Daniel on May 21st. Heretofore he had reported seeing a group of 5 or 6 several times close to the sawmill near the road at Twin Bridges.

Recommendations:

It was the opinion of this crew that until some census figure was accepted, the buck law was most applicable to these herds in the open area, for protection of the does is necessary to build up a large herd. Because of the number of antelope found in the hunting area, 641 actually seen, 897 reported, 1,000 estimated, and because the percentage of accidentally killed does during a buck season was not previously realized, it is recommended that instead of continuing the buck law in this area, a season on both sex be initiated for the taking of a total of 100 antelope.

It is further recommended that a more complete investigation be made of the newly planted antelope herds as to both natural survival and

adaptation to the new habitats and to poaching by individuals.

MOOSE

Moose in the Madison-Ruby Management Unit are relatively scarce. Perhaps they are as plentiful in the Upper Ruby country as anywhere in the unit. During a trip in a sno-cat up the Ruby River to the Black Butte country, 9 moose were counted. Moose also have been reported in the willows of Blacktail Creek, but they have not been seen by this crew while in the area or flying over it.

SUMMARY

A Big Game Crew composed of two men was stationed in Dillon throughout the winter of 1947-1948. The purpose of this work was to study the problems concerning big game in the three Big Game Management Units in southwestern Montana. This report is concerned with but one of these units -- the Madison-Ruby Game Management Unit.

During the winter, it was attempted to gather as much information and pertinent data applicable to big game management as possible. Such substantial data are needed to help remedy existing problems and to suggest management practices to prevent future problems from materializing. Studies to gain such information are briefed below.

Blacktail Elk Herd:

The Blacktail Creek drainage was recognized as one of the more important areas requiring concentrated efforts during the winter season. The winter-long study of elk in this area was climaxed with an aerial

census on February 6th. Nine hundred and ninety-three elk were counted within this drainage.

Recommendations are suggested as follows:

1. That summer studies be made in this area to check on migrations, summer ranges, and range condition of winter ranges.

2. That elk numbers be limited to the carrying capacity of the winter grazing areas chosen by the elk themselves - not by winter range available.

3. That the proposed optimum elk population be set this summer by all interested parties such as the Beaverhead Sportsmen's Association, Fish and Game Department, U. S. Forest Service, and ranchers on whose property the elk winter.

4. That an aerial census be conducted each year so that a more reliable and substantial picture of this group of elk can be developed.

5. That an elk tagging program be initiated so that definite information can be obtained about the migration routes of these elk to their respective summer ranges.

6. That a limited license elk season be opened for the taking of 150 bulls after the cattle are removed from the range.

7. That the hunting area be delimited as follows: Starting at Dillon, follow the Sweetwater Road to the Ruby River, thence up the Ruby River to Long Creek, thence down Long Creek to the Red Rock River Road, thence down the Red Rock River Road to Lima, thence down U. S. Highway #91 to Dillon.

Tobacco Root Elk Herd:

This elk herd was planted by the Rocky Mountain Sportsmen's

association near the Davis Ranch. A total of 69 elk were planted up to 1942. Last year a one-day season on either sex was opened. Sixty-five head of elk were killed in Nugget Gulch, approximately half of the total estimated herd. The remainder returned to the vicinity of the original plant near the Davis Ranch. No elk were seen in this area by this crew throughout the winter.

It is recommended that there be no regular elk season in this area for several years. Special seasons might be found necessary if probable damage to private property cannot be alleviated by fencing.

Ruby River Herd: (elk)

A large group of elk were reported wintering on the east side of the Ruby River in the Gravelly Mountains in the vicinity of the Canyon Camp-ground. After several investigations it was found that the largest number of elk seen in the area were 47 cows and calves, plus several bull elk and considerable sign, indicating that there might be 75 elk in the area.

Investigations in this area following the either sex deer season next fall should be instigated so that their numbers and origin may be determined.

Ruby River Deer Herd:

A sex ratio study of deer in the Ruby River area last December was followed by a deer census in cooperation with the U. S. Forest Service in February. These investigations indicate that the deer in this area have reached a population of over 2,104 and are increasing rapidly. The doe-fawn ratio was found to be 1 doe to .73 fawn, fawn crop 72.6%, percentage

of fawn in the herd 37%, and the sex ratio was found to be one buck for every 4.7 does.

It is recommended that:

1. That a reduction of deer numbers in this area be brought about to what the winter range will sustain in an unovergrazed condition. It is recommended that a season on either sex be initiated for the taking of 300 does and fawns. This season should be set simultaneously with the similar season on the Madison side of the Gravelles so that hunting pressure will be equalized.

2. That the area opened to both sex be delimited as follows: Beginning at the mouth of Greenhorn Creek, thence up Greenhorn and the North Fork of Greenhorn to Baldy Mountain, thence along the divide in a southerly direction to Crocket Lake Ranger Station, thence along the Divide Road to the West Fork Ranger Station, thence down the road to The Ruby River, thence down the Ruby River to Greenhorn Creek, the point of beginning.

3. That checking stations be operated in this area by a competent man throughout the hunting season in order to obtain vital information on numbers, age, sex, weight and measurements of deer removed from the area.

4. That this area be considered for the purpose of setting up long-time experiments and investigations on deer management problems.

Antelope:

Investigations and studies concerning antelope were conducted throughout the winter to determine the survival rate of the various plants in the vicinity and to obtain substantial information on the numbers of antelope included in the antelope hunting area.

Ground checks were made in the various ranges throughout the winter. Aerial census methods provided the most accurate information.

Sweetwater Basin Antelope:

Sweetwater Basin contains the largest herd of antelope in this section of the country. It has been the source from which the Blacktail Creek and Sage Creek antelope originated. The largest number seen here was 510.

Blacktail Creek Antelope:

No antelope were seen wintering in the Blacktail drainage. Some sign was seen during one flight over the area. It is probable that at least 50 head have wintered in this area.

Sage Creek Antelope:

One hundred and thirty-one antelope is the greatest total seen during a single day in this area. It is estimated that this number is about half of the antelope population in this extensive area.

Waterloo Antelope:

This is the only planted herd in this Management Unit and was started in 1946 consisting of 22 head. None of these antelope were seen personally during the winter. Deputy Game Warden Carl Daniel has seen as many as 13 at one time during an aerial flight.

Recommendations:

1. That since 641 antelope were actually seen within the hunting area, 897 reported, with an estimated 1,000 total, that a season on both sex of antelope for the taking of one hundred antelope be initiated, so

that the high percentage of does accidentally killed will not be left on the ground, but will be taken as legal meat.

2. That more complete investigations be made of the newly planted antelope herds as to both natural survival and adaptation to the new habitats and to poaching.

Moose:

Moose in this Management Unit are relatively scarce. During the winter season only 9 moose were seen.

Submitted by:

Richard L. Hodder, Fieldman
Wildlife Restoration Division

June 8, 1948

STATE Montana

PROJECT L-R (Eastern Montana)

DATE July 15, 1948

BEARTOOTH UNIT

AERIAL INSPECTION OF BEARTOOTH MOUNTAINS

DATE:

March 12, 1948

PERSONNEL:

Gene Tierney, Deputy Game Warden, Fish and Game Department

Don L. Brown, Assistant Big Game Leader, Wildlife Restoration
Division

PURPOSE:

The elk herd in the Beartooth Mountains south of Red Lodge had been inspected on February 3, 1948, by a ground crew, and it was the purpose of this inspection to determine what had happened to the elk since that date.

Deep snow in late January of this year, forced the elk down on an over-grazed range and into some haystacks. With the removal of this tempting hay, it was hoped the elk would move west to an area considered good wintering ground.

This survey was to determine the success of the plan.

PROCEDURE AND FINDINGS:

The crew took off from the Billings airport at 8:00 A.M., and

flew to the Grove Creek area lying east of the eastern tip of the Bear-tooth Range. A few tracks were seen here that appeared to be elk tracks, but no elk were seen.

After Grove Creek, the Rock Creek drainage was inspected. Approximately 50 head of elk were seen on the western slope; because some elk were in the timber an exact count was not possible.

The area, lying between Rock Creek and the West Fork, where the elk were seen on February 3rd, was looked at, but neither elk nor elk tracks were seen. This was the range it was hoped the elk would leave as it was already over-grazed by summer livestock.

The eastern slopes of the West Fork revealed a few elk tracks and on the western slope of the West Fork the major portion of the herd was found. Deputy Game Warden Tierney stated this was the 106 head seen between Rock Creek and the West Fork on February 3rd.

Unfortunately it was impossible to get an accurate count because of high winds and difficult down-drafts.

Deputy Tierney reports the Red Lodge Rod and Gun Club insisted on feeding the elk hay through the winter despite the protests from the Fish and Game Department.

This may present a difficult problem for the Department next winter if not stopped.

After a short look at the northern slopes of the Beartooth range, which revealed no evidence of elk, the crew returned to Billings.

CONCLUSION:

It is concluded the removal of the haystacks on the Wapole Ranch, as recommended from the inspection of February 3rd, served its purpose

in causing a migration of elk to the west.

Although the snow was very deep, it was not crusted, and it is believed the elk would have wintered satisfactorily without the handout of hay.

Deputy Game Warden Tierney reported no browse line was evident in any part of the range.

RECOMMENDATIONS:

It is recommended this elk herd be reduced to 150 animals and held to that number. This will probably not meet with the approval of the local sportsmen, but the Forest Service has recommended a reduction to fit the available winter food. It is estimated there are 175 elk now using the range.

If the feeding of hay in this area is not discouraged, it will probably lead to the same problems on a small scale, as those encountered in the Jackson Hole feeding program.

Submitted by:

Don L. Brown, Assistant Big Game
Leader, Wildlife Restoration Division

May 6, 1948

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

BLAINE UNIT

ANTELOPE DAMAGE INSPECTION

Loma-Hopp Area

DATE:

June 5, 6, and 7, 1948

PERSONNEL:

Ed Giebel, Chouteau County Sportsmen's Club

Don L. Brown, Assistant Big Game Leader, Wildlife Restoration
Division

PURPOSE:

Reports of damage to winter wheat fields by antelope have been received from several farmers in the Loma-Hopp Communities. This inspection was made for the purpose of determining the extent of such damage and to recommend the necessary steps to prevent further damage.

PROCEDURE AND FINDINGS:

The area between Loma and Big Sandy was inspected from the air on June 6, 1948. At that time no antelope were seen on the wheat fields although eight were sighted in the vicinity. No evidence of damage was

noted in the fields and the few antelope present would not seem to present a threat of potential damage in this area.

The farmers of the area reported that antelope were frequently seen in the fields during March and April, but had not been seen lately.

This entire area lying north and east of the Missouri River, has extensive winter wheat acreage and as a result the natural antelope range has been reduced to the sharp coulees and rough breaks. Even though the antelope population is small this natural range may not furnish sufficient forage, and they may travel into the cultivated areas for food.

CONCLUSIONS:

Several assumptions can be made concerning the antelope in this section of northern Chouteau County, but the most logical conclusion would seem to be that because of the small amount of available natural antelope food in the early spring, these animals are forced to forage on the cultivated land.

For several years it has been assumed by some that the antelope were found in wheat fields only because the weeds there were readily available. This year many of the farmers have sprayed their wheat fields with weed killer with remarkable success; thus the absence of weeds may account for the antelope leaving these fields.

Another assumption is that the antelope were in the wheat fields during March and April because these fields offered the earliest green vegetation, but since the grazing lands have become green the antelope have migrated back to their natural forage.

It is believed many of these complaints were not made for the purpose of requesting relief from antelope, but they were voiced merely as a topic of conversation.

Finally, it is concluded there are so few antelope in this entire area the damage they could inflict on any field would not be worthy of mention.

July 8, 1948

Submitted by:
Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

CARTER UNIT

CARTER COUNTY ANTELOPE STUDY

SUMMER 1947



Montana Fish and Game Department
Wildlife Restoration Division

Submitted by:
Gerald Salinas, Field Assistant
Wildlife Restoration Division

July 1, 1948

TABLE OF CONTENTS

	<u>Page</u>
PERSONNEL AND DURATION OF STUDY.	259
PURPOSE.	259
PROCEDURE.	260
FINDINGS	263
MIGRATION	264
General Aspects.	264
The Usual Winter Migration	267
Migration of the Abnormally Severe Winter.	269
Migration in the Three Local Wintering Areas	271
RANGE.	281
Summer Range	281
Winter Range	283
Notes on Antelope Food Habits.	283
MORTALITY.	285
Winter Mortality	285
Disease.	287
Predation.	288
Other Losses	289
NOTES ON RANCHER ATTITUDES.	289
Antelope Population.	289
Hunting Activity.	290
GENERAL FIELD NOTES.	292
POPULATIONS.	294
Antelope Population in the Carter Unit	294
Sex Ratios.	296

(continued)

TABLE OF CONTENTS (Continued)

	<u>Page</u>
SUMMARY AND DISCUSSION.	298
RECOMMENDATIONS.	303
BIBLIOGRAPHY.	307

List of Illustrations

TITLE PAGE.	256
MAP NO. 1 THREE MAIN DRAINAGES.	261
MAP NO. 2 WINTER DISTRIBUTION AND MIGRATION ROUTES.	266
MAP NO. 3 SUMMER DISTRIBUTION.	273
FIGURE 1 OWL CREEK BREAKS AREA.	278
FIGURE 2 THE HEAD OF TIMBER CREEK.	278
FIGURE 3 "FINGER BUTTES".	279
FIGURE 4 TWIN FAWNS.	279
FIGURE 5 SAMPLE: RANCHER INTERVIEW FORM	306

CARTER COUNTY ANTELOPE STUDY

PERSONNEL AND DURATION OF STUDY

The following study was conducted from July 21st to August 16th, 1947 by Gerald J. Salinas, Temporary Field Assistant, Wildlife Restoration Division under the supervision of Don L. Brown, Assistant Big Game Leader, Wildlife Restoration Division.

PURPOSE

The population of pronghorn antelope in the Carter Unit has increased during the last decade to the point of possible over-stocking on some of the winter ranges.

The ranchers of the unit have for a long time been very tolerant of the large numbers of antelope occupying their lands. However, several complaints of damage had been received from these ranchers previous to the time this study was made. A number of ranchers have complained of damage to alfalfa fields and others have expressed concern over the heavy winter concentrations of antelope. These, they feel, may facilitate the spread of disease and are a hazard to both domestic stock and the antelope.

In the past, information about the migration, summer and winter concentrations and life history of antelope in the Carter Unit has been meager. For this reason a fieldman was sent into the area to obtain data that might be used in drawing up future management plans.

It was not intended that this summer's study would cover all the

detailed phases of the problem. It's main purpose was to lay the ground work for future investigation and year around observations.

PROCEDURE

Since there was much desirable information to be obtained and comparatively little time for gathering it, the only practical approach to the problem was to contact ranchers of the area and obtain as many of their year around observations of the antelope as possible. The data gathered from these local ranchers were recorded on a stardardized form that will be referred to in the rest of the report as the "Rancher Interview". This report is based on information taken from these forms. The "Rancher Interview" was developed before the field work was started in order to prevent oversight of important points while making field contacts. County maps were used to acquaint the field man with the area and for location of major concentrations, etc.

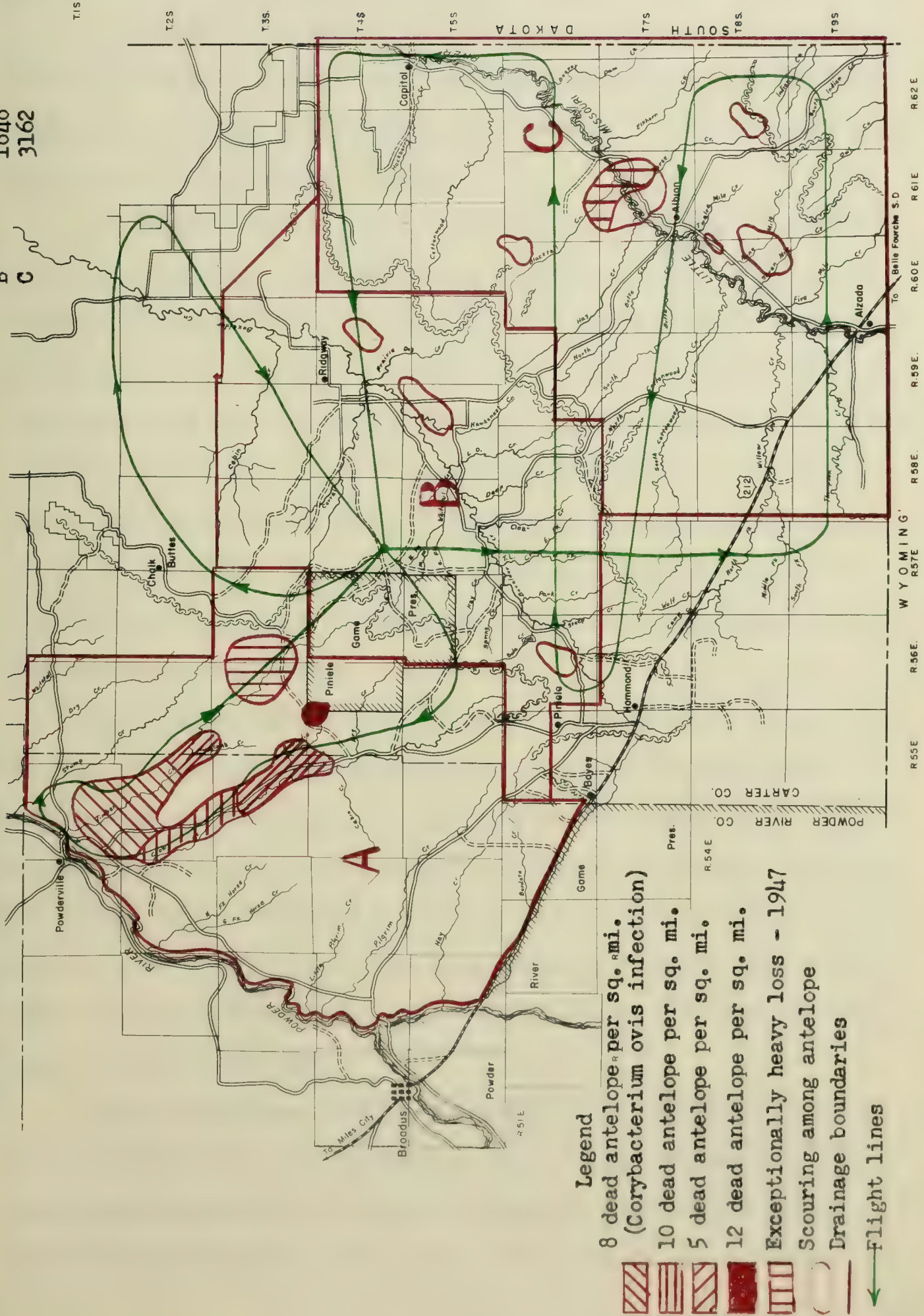
The fieldman traveled by car from one ranch to the next. By traveling in this manner and taking information from ranchers, most of the better antelope ranges were visited. Field observations were made on the antelope range whenever time permitted.

The study area is that major antelope range in southeastern Montana which roughly forms a rectangular block of land extending thirty miles north of Highway 212 and covering the sixty miles from Powder River to the South Dakota Border. This antelope range lies in the Carter and Powder River A, B, and C, hunting areas and will be referred to in this report as the Carter Unit.

The area was worked in three sections that are separated by natural barriers. As seen in Map No. 1, these sections are set apart by

MAP I. Three Main Drainages

Area Aerial Census No. 2506
 Powder River 1848
 Box Elder 3162
 Little Missouri



the divides which lie between the main drainages of the area. The Powder River and Boxelder Creek make up two of these sections and the Little Missouri River and Owl Creek make the third. Drainage area borders which appear on the map were arbitrarily established to include ranches which were visited in the various drainages.

The Powder River section was worked on the east side of the River as far north as its junction with Stump Creek which lies a short distance northeast of Powderville. The southern limit of the antelope range in this drainage area includes that country which lies east of the Little Powder River and north of highway 212. The eastern boundary of the Powder River drainage is roughly the divide between this River and Boxelder Creek. (The Little Powder River is unmarked on the accompanying maps, but can be easily seen as the main tributary that forms the east branch of Powder River and joins it just north of Broadus.) The Powder River area was worked from Broadus.

The Boxelder section is bordered by the Powder River divide on the west and the Boxelder-Little Missouri divide on the east. The northern edge of this area was in the vicinity of Ridgway, while the southern limit of the antelope range was found to run parallel and about 5 or 6 miles north of Highway 212. This unit contains the southeastern corner of the Pineale Game Preserve. The Preserve lies in the relatively high country of the Powder River-Boxelder divide and has an area of about 46,080 acres.

The Little Missouri-Owl Creek section is bounded by South Dakota on the east and Wyoming on the south. This includes the heads of Owl and Indian Creeks which flow into South Dakota. The Boxelder-Little Missouri divide forms the western edge. The northern and southern

limits are Capitol and Alzada. Little of the area southwest of Highway 212 was included. There will be repeated references to these three areas in the findings of this report.

Graded county roads follow the three main drainages and in dry weather the ranches can be easily reached on side roads extending from these.

The ranchers were cooperative and were apparently anxious that their personal observations be made available for use by the Fish and Game Department.

On July 30, July 31, and August 1, an aerial count, using the strip method, was made in the Carter Unit. Although the antelope were beginning to bunch into small herds the distribution was fairly even and it is believed that the count is reasonably accurate. It was assumed that 100% of all antelope in the flight path were observed. Three fifths or 60% of one mile was covered on each flight, strip selected at random. One mile was covered by the observers in the plane when the flight path followed a major drainage. Flight altitudes varied from 50 to 500 feet depending on the topography and existing light conditions. Map No. 1 shows distribution of the antelope population as determined by the summer aerial count. The flight lines which were made during the aerial count are also represented on this map.

FINDINGS

The migration pattern, population distribution, description of range conditions, and discussion of mortality and other factors will be treated in the following sections of this paper.

MIGRATION

General Aspects

Most of the area of the Carter Unit is a natural antelope summer range, comprised of open country and low divides which lie between the major drainages. The drainages, as previously described, break the country into three parallel sections. A general northwesterly migration is observed in each of these areas every fall. The reverse of this is seen in the spring. The routes of these migrations are shown on Map No. 2.

Herd Composition in Relation to Migration

Herd composition fluctuates with the seasonal antelope movements.

The antelope return in small groups to the summer range at the end of the winter. There is no sudden massive movement of the type which may occur in the fall.

Small bands are widely dispersed on the summer range by late May and early June when the fawns are dropped. It is believed by game men that antelope populations reach near-perfect distribution at this time since wet does tend to seek maximum isolation from others. Even at fawning time, however, there are some small bands of bucks and other mixed groups. As summer passes, nearly all the antelope begin to gather into the small groups. These range freely, but all movements are local.

By the time of the rut in late September small bands have been formed. These begin to shift toward the winter range in November and their size may increase as they move. There is a considerable difference between these and the larger bands which may form and drift in the more severe winters.

Extent of Migration

Past contacts with the Carter herd has raised the question as to whether the winter migration is merely a local shift of antelope in each drainage or local and extensive migrations from South Dakota to Bozelder Creek and Powder River. It was previously felt that the former condition was probably the actual case. Migrational data was recorded with this problem in mind. The results of this investigation indicate that depending upon the severity of the winter, the winter migration is merely a partial shift, a shift in the local drainages or a longer movement. This agrees with the findings of Bailey (1936), Beer (1944), and Carhart (1942).

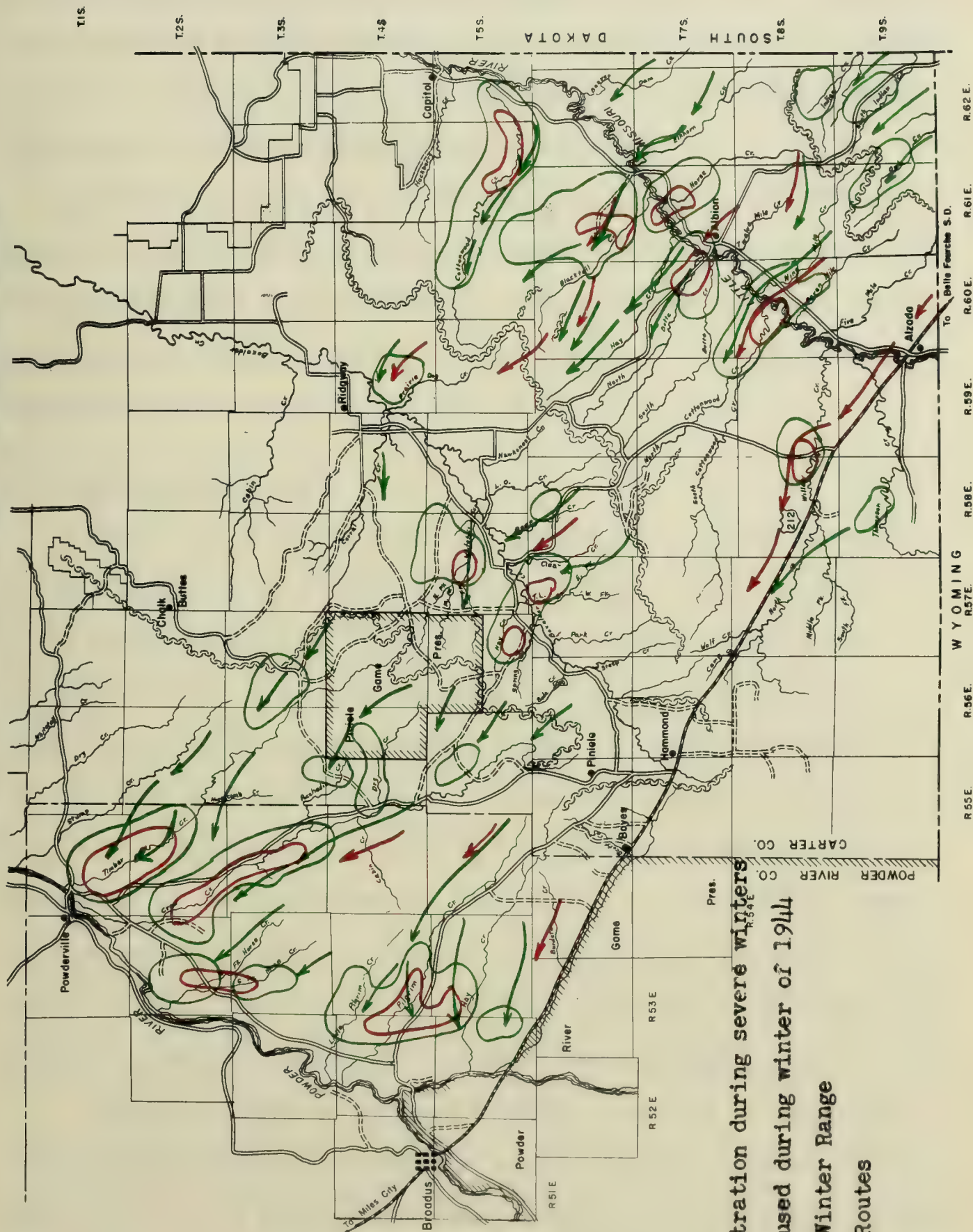
The winter migrations are mainly of two types; those that occur during normal winters, and the larger winter movements that take place during winters having severe storms and excessively deep snows. Carhart (1942) also points out this two phased migration. These two migrational patterns will be treated separately. Some incidental information concerning the unusually mild winter conditions is also included.

The following data are shown on Map No. 2.

- (1) Migration routes which are used during mild winters and during winters of usual severity.
- (2) Some of the migration routes known to have been used by antelope during the long migration of November 1944.
- (3) Winter range concentrations during usual winters.
- (4) The concentration areas of very severe winters.

The relative sizes of both types of wintering areas are no indication

MAP II. Winter Distribution and Migration Routes



Concentration during severe winters
 Route used during winter of 1944
 Usual Winter Range
 Usual Routes



of actual numbers which occupy them. During very mild winters animals are found on the usual winter ranges and in suitable parts of the summer range. Under severest conditions a large portion of the antelope move to shelter in the Powder River drainage.

A general treatment of the two phased migration in the entire Carter area will be presented first and this will be followed by a more detailed discussion of the migration to the four local wintering areas. These together should provide an overall picture of migration during both "open" and unusually "hard" winters.

The Usual Winter Migration

Need for food is the chief cause of the annual winter migration. In the winter there is a definite "heavy snow" belt which covers most of the summer range in the Carter Unit. The snow belt extends east into South Dakota. Snow covers most of the low forage of the open divide areas, but leaves considerable browse and shelter available in the partially wind-swept breaks of the four main creeks. This snow-free condition is especially noticeable in the Powder River Breaks at the western end of the antelope range. Here, as in the other winter ranges, antelope are seen feeding in areas of the larger sage type that are not covered by snow. Two sage species of major importance in this range are Big Sage (Artemisia tridentata) and White Sage (Artemisia cana).

The western edge of the deep snowbelt is limited by the Powder River-Boxelder divide and it extends to the headwaters of those creeks that drain into the Powder River from the east. The divide runs northward from the vicinity of Hammond which is located on Highway 212. This climatic condition is apparently caused by prevailing winds and storms that

approach the area from the Dakotas to the east. The main effect in the Carter Unit is felt in the territory lying east of the Powder River-Boxelder divide.

The above described snow pattern explains in part the local migrations to shelter in wintering areas of the three main drainages of Carter Unit. It may also explain the migrations which result in large concentrations of antelope in the Powder River Breaks during the exceptionally hard winters.

From the information that was gained in "Rancher Interviews", it is apparent that the movement of antelope, during usual winters, is for the most part local.

The following paragraphs pertain to these local winter migrations:

A glance at the map shows that the east side of the Powder River Drainage is a much larger area than the Boxelder drainage and includes a large area of good antelope summer range. Thus the concentration in the Powder River Breaks during the less severe winters may well be a local shift.

During an open winter the Boxelder drainage contains as many or more antelope than during the summer. This indicates little movement of antelope from the Boxelder during open winters, although many of these animals move to Powder River during severe winters and the antelope which summer on the east side of Boxelder are conspicuously absent. The extent of migrations during normal winters will be further elaborated upon in the discussions of migration in the three local wintering areas.

Migration of the Abnormally Severe Winters

The snow belt is well marked during the more severe winters. Nearly all of the higher range is blanketed with snow after the first heavy storms. The low growing forage of the open country is thus inaccessible to antelope from the beginning of winter.

The main summer ranges in Carter Unit are a bleak and open type, the terrain of which makes it difficult for antelope to obtain food and survive during hard winters. With the onset of winter storms they are forced to move into the breaks where there is browse and protection.

The following paragraphs describe the long winter migration:

With the increase of antelope numbers in the Carter Area during the last decade the winter migration has become more noticeable. The increased numbers may be a factor which contributes to a greater need and tendency for long migrations, especially during severe winter weather. This agrees with Carhart (1942) and incidental information obtained from the Highline in northern Montana.

The occurrence of long migrations during the severe winter of 1936 and again in the fall of 1944 is substantiated by a number of statements from ranchers.

During the winters of 1936 and 1944-45 many of the ranchers, particularly those in the upper ends of Crow Creek and Pilgrim Creek, observed tired antelope which were thought to have drifted in from a long distance to the east.

Large numbers of antelope were also observed passing through different sections of the main drainages during the winters of 1936 and 1944-45. These were apparently long migrations.

During the winter of 1944-45, the usual heavy concentration of antelope did not remain in the Little Missouri area. Large numbers of antelope were observed traveling westward a short distance north of Alzada and in various areas along the north side of Highway 212.

In addition very large numbers of antelope passed through the usual migration routes of the Little Missouri drainage. A large number of migrating animals passed through Nine Mile Creek. Large numbers of antelope came in from South Dakota--passed through the Albion region and Blacktail Creek in the Little Missouri drainage and continued westward through the Finger Buttes region. The "Finger Buttes" are a distinctive land mark that jut out from the Boxelder-Little Missouri divide at the head of Blacktail Creek. These can be seen on the maps and in figure 3.

Permanent Population Influxes

The winter migration pattern during severe years may be responsible for some re-distribution of antelope.

Antelope normally return to their summer ranges at the end of winter and does attempt to return to their home range before dropping their fawns each spring.

Many of the antelope never returned to their original summer ranges after the large migration of 1944. A few new herds remained on the east side of the Little Missouri. Some of the antelope may have been stopped during their eastward spring movement to summer range by flooding creeks which are ice covered during the fall migration, although instances of antelope swimming rivers during their spring migration are known. Movements of animals in the Little Missouri area was also

inhibited by fences.

With the dropping of fawns new resident populations are established in an area. This occurs commonly after an unusually long winter migration.

Where the new range is favorable a large increase of antelope is often seen. The resulting increase has not been great in the Little Missouri area, but it does represent a larger year around population of antelope than was present prior to 1944-45.

Migration in the Three Local Wintering Areas

The best method of obtaining a true picture of migration as it occurs in the Carter Unit is to describe migrations as they are seen in each of the four main local areas. These parts placed together comprise the total migration in the unit. This is the logical way to use the information gained from rancher interviews, since each rancher sees local conditions rather clearly, whereas his concept of the over-all problem is less reliable and may be incomplete.

An analysis of the population figures, given by the ranchers in interviews, indicates that there is a shift of antelope between the summer and winter ranges. The number of antelope in any area is apt to fluctuate widely during different seasons of the year. This further substantiates the ranchers' description of seasonal migration. The population figures represent an estimate of local ranchers and although they may not be completely accurate, they do yield relative values which can be used to some extent for management purposes.

It was also found that the summer distribution and population of antelope as indicated by ranchers was comparable to the summer aerial

count made during July 30, 31, and August 1st in this area.

Rancher estimates of the population for each of the main drainages during summer, winter, and extremely severe winters were secured. Data on the ratio of summer to winter numbers in each drainage area and the relative abundance of animals in the various areas during both seasons were thus obtained.

The antelope population density figures for each drainage area were derived by dividing the number of sections of land in that area into the number of antelope reported in the area during the three previously mentioned periods. The resulting population densities for various parts of the range have been transferred to Map No. 3 which shows summer distribution and Map No. 2 which shows winter concentration areas. A total estimated summer population for the three drainage areas has been compiled and is shown in Table No. 1.

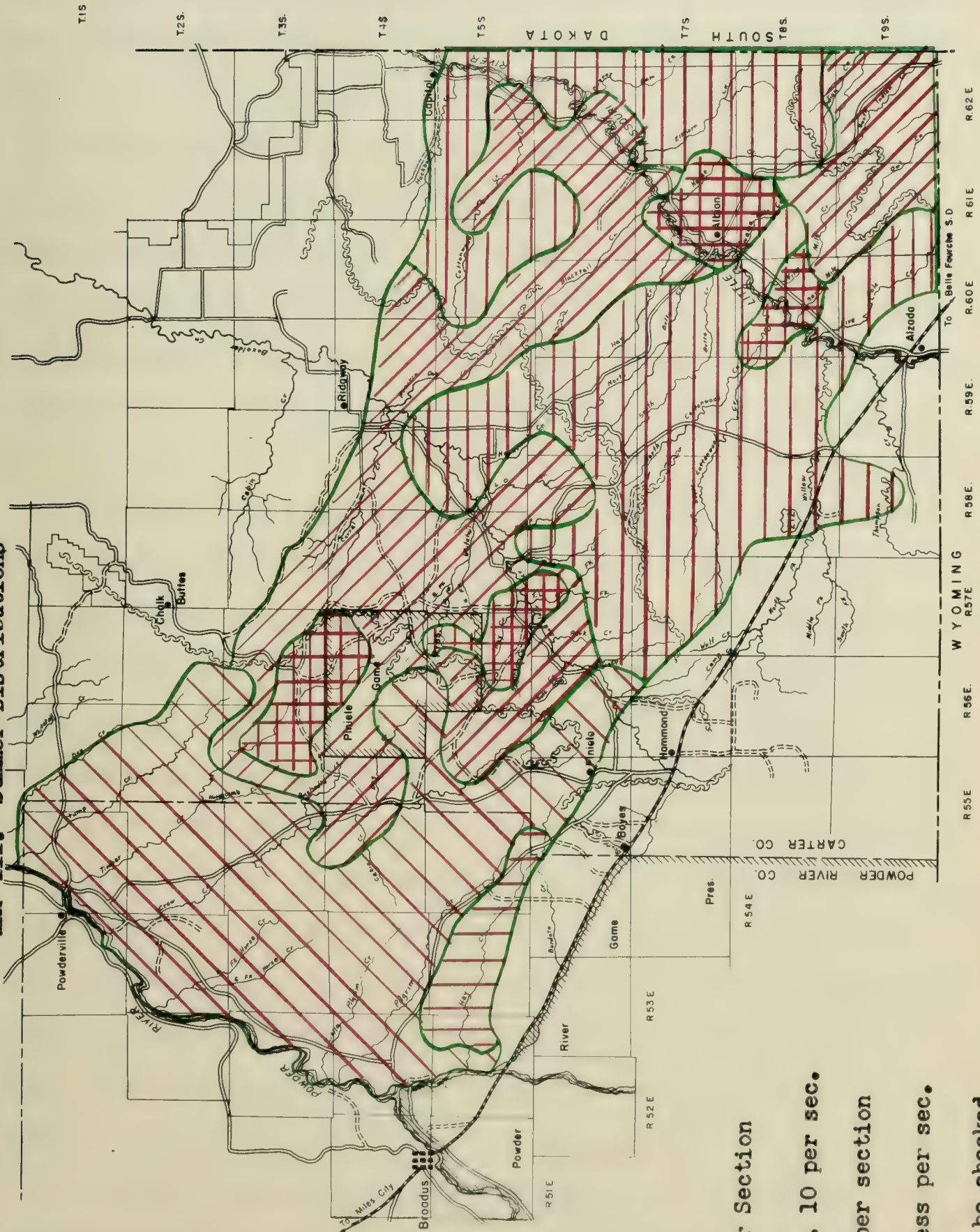
A description of the migration as it is seen locally is also included in this section of the report. The following is a description of the migration in each of the four local wintering areas.






Migration in the Powder River Area

The heart of the antelope's summer range is in the relatively high country of the Powder River drainage which lies east of the Powder River county line and extends into the region of the Boxelder divide. The estimated summer population is about 10 antelope per square mile. The winter density of this area varies from 10 to 15 antelope per square mile during open winters. Practically no antelope remain there during severe winters.

The usual winter range for antelope in the Powder River area

MAP III. Summer Distributions



-  2-4 per Section
-  Approx. 10 per sec.
-  10-15 per section
-  5 or less per sec.
-  Should be checked further.

forms a belt which lies parallel to and a short distance from the Powder River. This range extends into the main side drainages including Timber, Crow, Pilgrim, and Hay Creeks.

During summer, there is generally a low population of antelope in this winter range belt and in that entire area extending from Powder River eastward to the vicinity of the Powder River county line. The summer population density is estimated by ranchers to be 2 to 4 antelope per square mile. There is possibly a greater density in the Hay Creek region, but this was not confirmed. That area is indicated on Map No. 3.

This map shows summer distribution of antelope in the Carter Area. The map is self-explanatory. The usual summer distribution of antelope is shown on the map and while the densities which are indicated may not be too accurate the picture of relative distribution should be good. All the figures of antelope population densities are rough approximations, based upon rancher estimates, and are probably a little high for the total acreage of each enclosure on the map.

One rancher was of the opinion that there was a large number of antelope on this winter range during most of the winter. He described these concentrations as "A series of bands which are seen for about 30 miles along the Powder River." This winter range is 8 to 10 miles in width. The description is probably representative of an extreme condition.

Antelope winter heavily on Lower Hay Creek. On the Pilgrim Creek drainage the antelope winter mainly in the Powder River Breaks that lie a few miles east of the river itself. Further down, the Powder

River from Pilgrim Creek, the antelope numbers vary greatly with the type of winter. This seems natural since no large drainages come into Powder River for 15 miles between Pilgrim Creek and Crow Creek— hence only severe weather drives large numbers of antelope into the entire wintering area.

Although relatively few antelope summer on that lower part of Crow Creek, which lies in Powder River County, it is an important winter concentration area. The winter population density is usually more than 20 antelope per section. This figure is based on ranchers' estimates and is of limited value since they only ride over the lowlands in winter.

The antelope are not present on lower Crow Creek in such large numbers during mild and open winters. Those, which ordinarily move closer to Powder River, winter locally in the breaks of upper Timber Creek, Dry Creek and Crow Creek. These areas are shown on Map No. 2. Thus, antelope tend to winter in the higher country near the headwaters of these three drainages whenever it is possible and the breaks of lower Crow Creek provide additional shelter whenever it is needed.

The ranchers throughout the surrounding Powder River country consistently report a much larger antelope concentration in Crow Creek than do the resident ranchers. Crow Creek which is reputed to be an extremely heavy winter concentration area — has an estimated population density only three-fifths as great as that reported for lower Pilgrim Creek and Hay Creeks. It is estimated that there are 30 animals per section in the latter wintering areas. The relative importance of these two winter range areas should further be determined in the field.

The winter migration on lower Timber Creek consists of a movement of antelope toward the Powder River as the winter becomes more severe. Further up Timber Creek, the antelope cross into Crow Creek and the Powder River Breaks to the south of it. The migration routes and winter distribution are shown on Map No. 2.

The summer range-winter range relationship and the accompanying migration can be readily seen by referring to Map No. 2 and Map No. 3.

The seasonal migration is certainly not a clearly defined activity. After the antelope have moved into the lower areas and have apparently come down for the winter they shift back and forth from the breaks region to the creek bottoms -- with local weather changes. They come out on the higher flats during days of good weather and retreat to shelter during storms. This is especially noticeable in the Crow Creek area.

This type of behavior parallels the larger population shifts in which Timber Creek, Dry Creek and upper Crow Creek are used as local winter range during open winters. Lower Crow Creek and the Powder River Breaks are the winter ranges during more severe winters. The head of Timber Creek is shown in Figure 2.

To attempt a prediction of the extent of a particular winter's migration would be no more successful than a long range prediction of that winter's weather. Although the "normal" condition cannot be defined, those types of winters which can arbitrarily be called the "usual" and the "unusual" -- reveal that there are actually three degrees of migration and these are directly correlated with the severity of a particular winter's weather -- mild, of usual severity, or abnormally severe.

During the severest winters when the antelope range in lower Crow Creek and the Powder River Breaks, migration from the divide country is nearly complete.

Very few antelope ever cross to the west side of Powder River or Little Powder River. This is true during even the more severe winters. The local ranchers are in agreement on the location of this winter range boundary. Topography probably limits movement beyond this.

After the antelope have moved in from the higher country to the east, they find food and shelter on the sage-covered breaks on the east side of the Powder River. There is apparently no need for the antelope to cross the river.

Migration in the Boxelder Area

Fairly large numbers of antelope summer in the Boxelder area. The west side of the Boxelder drainage has a summer population of approximately 12 antelope per square mile. The summer density to the east and the extreme northern end of the range is about 8 antelope per square mile. Relative summer population densities are shown on Map No. 3. There is a slight unavoidable discrepancy between these detailed population densities and those shown on the map.

During open winters most of these antelope winter locally. There appears to be a shift from the east to the west side of the Boxelder area and there may be a larger number of antelope during an open winter than in the summer. The open winter population on the west side increases to more than 15 antelope per section while the density on the east side drops to five or less antelope per section.

During severe winters there is some movement of antelope from the



Fig. 1 Owl Creek Breaks Area
(Owl Creek in Background)



Fig. 2 The Head of Timber Creek



Fig. 3 "Finger Buttes" (Viewed from the
Boxelder-Little Missouri Divide to the
Southwest)



Fig. 4 Twin Fawns
(In the Head of Dry Creek)

Boxelder drainage into the Powder River area. Only about 3 to 4 antelope per section remain on the west side of Boxelder Creek and about 3 or less antelope per square mile winter on the east side.

The heaviest snow in years occurred on November 13th and 14th of 1944. Large groups of antelope moved through the Boxelder drainage in an abnormally large westward migration. These appeared to have come a considerable distance -- perhaps from the western edge of South Dakota. Practically all the antelope moved out of the Boxelder drainage during that winter.

Migration in the Little Missouri Area

Antelope, in large numbers, normally take three rather distinct migration routes across the Little Missouri drainage. These routes are shown on Map No. 2. They follow Blacktail Creek, pass through the region just north of Albion, and through the North and South Forks of Cottonwood Creeks.

The county road along the Little Missouri follows a fenced lane. During the fall migration the antelope are usually held for several weeks while they work their way through these fences and across the River. Some woven wire fences impede the natural migration in this area.

Considerable numbers of antelope winter in the lower parts of Horse and Elkhorn Creeks during ordinary winters. Antelope also winter in South Indian Creek and the head of Owl Creek. These two Creeks drain into South Dakota to the east, but there is apparently a westward migration into their headwaters during the winter. The Owl Creek Breaks are shown in Figure 1.

The antelope move from most of the area on the east side of the

Little Missouri River and the Owl Creek Breaks during very severe winters. They pass through the Little Missouri in a westward migration. During the winter of 1944, large numbers of antelope passed just north of Alzada. This is an unusual migration route and these antelope were apparently driven long distances by the deep snow.

During the winter of 1947 antelope wintered close to the Little Missouri bottom in the vicinity of the three main crossings. Since 1944, antelope have wintered near the Little Missouri River. A greater number of antelope now remain on this range during summer and winter.

A rather large antelope population winters along the west side of the Little Missouri. These concentrations are seen in the vicinity of Cottonwood Creek, on the flats near Blacktail Creek and on the lower parts of the North and South Forks of Cottonwood Creek.

The more exposed summer ranges on the Little Missouri area support no antelope during the usual winter. In early winter large numbers of antelope remain in the Little Missouri drainage. However, if the weather becomes too severe they drift westward and many of them are gone for part of the winter.

An increase over the summer antelope population is observed during winter. Ranchers attribute part of this to influxes from South Dakota which are apparently an annual occurrence.

RANGE

A detailed investigation of range condition was not possible during this study. The following incidental information was obtained.

Summer Range

Large numbers of antelope are now thriving in the summer range without causing range depletion or appreciable resentment from the ranch-owners. The ranchers' comments indicate that the summer use of range by antelope causes no noticeable damage.

There have been complaints of summer damage in only a few local areas and these involve cultivated crops. Owners of alfalfa fields report most depredations.

Carter County range is in good condition. Favorable growing seasons during the past decade are thought to be responsible for this. The year 1947 was thought by most ranchers to be the best grass year since 1927. The range is looking better than it has ever within the memory of reliable old timers. The wild hay crop of Bluestem grass (Agropyron smithii) was excellent in most areas. Federal range men agree that the ranges of the Carter area are in excellent condition.

Although there is an upward trend of the range due to this period of favorable climate and apparent proper use, it was not felt that the condition of all the range was good. Certain areas have large amounts of cactus. This may be an indication that these portions of the range have not completely recovered from the effects of the plow and previous hard use. Local range condition is certainly not good in the vicinity of salted reservoirs.

Several ranchers were concerned over the possibility of range competition between antelope and domestic stock in the event of a future dry weather cycle.

Under certain conditions during the fall, domestic alfalfa fields, in some local areas, may be used by the antelope as a part of their range.

Ranchers are able to eliminate this by adequate fencing. Although expensive, some ranchers consider this to be worthwhile. Some of the ranchers believe alfalfa damage is not too extensive. This alfalfa damage is thought by a number of land-owners to be negligible although occasional damage may occur when animals run through ripe stands.

The problem of antelope damage to cultivated crops in the Powder River drainage may increase with the future development of Moorhead dam.

Water is probably no limiting factor in the Carter area due to the presence of numerous stock reservoirs.

Winter Range

Some factors which influence the winter range have already been presented in this report under "Migration". These include a general picture of the physiography of the Carter area which describes the open summer ranges and the sheltering character of the winter ranges; the effect which the winter's severity has upon range availability, and the hampering effect of sheep fences upon free movement of the antelope.

The previously mentioned "snow-belt" condition is a part of the winter range picture. During mild winters, there is often much bare ground to the west of the Powder River divide. Food is also available further east in the local wintering areas of Boxelder Creek and the Little Missouri. During severe winters deep snow makes more of the feed east of the Powder divide unavailable to antelope.

Notes on Antelope Food Habits

A rancher who has kept an antelope as a pet said that its diet

mainly consisted of weeds in the summer and sage and other browse in the winter.

It has been noticed in some areas from the antelope shift from black sage (Artemisia frigida) to white sage (Artemisia cana) when the former is covered with snow. These common names are of local usage.

The antelope's diet apparently shifts in fall and winter to browse. Ranchers believe they feed upon sage and salt sage during this season.

This introduces several questions. Is there a shift to browse because it is available while other feed is covered with snow? Would the antelope take larger percentages of cured grass and dry weeds if they were available? Is there a seasonal need for woody browse in the antelope's diet during winter? What do the antelope feed upon when they leave the breaks area and return to high ground during open weather?

Year around analysis of food habits for Montana antelope is needed. A seasonal food study would yield valuable information. The data could be tied in with information which is already available, Buck (1947), Couey (1946), and Buechner (1947).

Several ranchers reported that antelope do not eat hay. In some instances antelope have been seen in near starving condition and still they did not feed upon available hay.

It was noted during the summer aerial count -- that no antelope were found within approximately one-half mile radius of sheep. However, it became apparent during the "Rancher Interviews" that antelope are present in large numbers on some sheep ranges and totally absent from others. The explanation for the presence of antelope and sheep on the

same range may be due to the presence of rough breaks in the area which provide the antelope with abundant food or in some instances the ranges may have been used by sheep only recently.

Range competition between antelope and sheep seems apparent from the similarity of their general food habits. By a similar token there is probably little competition between antelope and cattle on the summer range. Buechner (1947).

MORTALITY

Winter Mortality

Woven wire and sheep proof fences impede the natural migration pattern, which has been to drift ahead of severe storms to protected areas. These particular fences provide a definite problem -- especially during the more severe winters. These fences, which are increasing in numbers, often delay the antelope along their route to the winter range. By restricting movement, they cause antelope to be caught in areas which offer little protection and food during storms. Some of these antelope become weakened and eventually winter kill.

Large numbers of antelope are often held by fences on their way to winter range. Sometimes antelope pile up against sheep fences for 4 to 5 days before a storm and they are often released by ranchers who open gates or sections of fence for them.

It might be possible to aid some antelope which become piled up against fences during a severe winter by driving them with a plane in such a manner that they can continue their migration without delays of several days.

During severe winters there is a large die-off of antelope in Crow Creek and the Powder River Breaks. A number of questions and some of the possible answers arise.

This condition may be the result of a combination of factors. The antelope population may be reaching the carrying capacity of its winter ranges. The fences may weaken animals that are forced into long migrations for food and shelter. These and other factors may finally bring about losses from disease.

Winter losses may be an indication of winter food stresses under severe weather conditions. Antelope have been seen in the willow bottoms for the first time during the winter of 1947. This may be a newly acquired habit or it may be a sign that the winter concentrations are becoming excessive. Apparently antelope of various ages die during the winter. Ranchers believe there are often less antelope returning to the summer ranges in the spring than the numbers that migrate in fall. This may be due to differences in observation, or it may tie in as an indication that during severe winters -- the winter kill is great enough to be actually noticeable when the wintering bands retrace their migration routes to the summer ranges.

Heavy losses that occur in hard winters like that of 1944-45 can be attributed, in part, to the fence problem. Disease may also figure in as a factor contributing to the deaths of weakened animals. However, the possibility of there becoming an over population of antelope in the Carter Area seems quite real, even in the face of certain decimating factors and adverse conditions. There is much need for on-the-spot investigation of antelope winter conditions.

Disease

It was originally hoped that additional information could be gained concerning the extent of the antelope disease condition, which had become noticeable during the spring of 1947. This study was to contain a follow-up of information in the report "Antelope Investigation in Carter Unit", which was conducted by Faye Couey and Don Brown, May 30th and 31st, 1947.

However, the summer study was conducted too late in the season to determine, at first hand, a great deal of additional information concerning the infected area. None of the ranchers contacted in the area had seen any currently ailing antelope at the time of this study, however, one rancher had disposed of a "stoved-up" buck a week or so earlier -- this was the last one known to him.

The following is an important point supporting the possibility that the antelope infection extended over a greater area than was originally supposed. The rancher on the lower Timber Creek range, which was thought to be the focal point of the (Actinomyces necrophorus) and (Corynebacterium ovis) infections, estimated 8 dead antelope carcasses per section of the range he observed. However, some ranchers in Dry Creek and Crow Creek estimated nearly as high and even higher losses. Although these ranchers were unable to determine the cause of antelope deaths on their ranges, the figures alone and the proximity of this range to proven infected antelope range make it highly probable that disease may also have been a contributing factor in their winter kills. Areas of heavy antelope winter loss during 1947 are indicated on Map No. 1.

It may be well to point out that the ranchers in the region of the

large winter losses usually ride only low lands during winter. Heavy die-offs which were observed during the late winter in 1947 (8-10 antelope per square mile) are probably representative of bottom concentrations only.

In the Little Missouri drainage, considerable scouring among young antelope is some times noted. This diarrheic condition is thought by some ranchers to be a worm infestation and may be an important factor which reduces the fawn crop considerably in this area. Locations where there has been scouring among antelope, especially young, sometime during the last two years are shown on Map No. 1.

Predation

There is definitely some eagle predation upon antelope. Two ranchers who fly a plane in the Boxelder area and one rancher who lives on lower Crow Creek report a total of 16 eagle kills which they have witnessed in the past few years. A rancher in the head of South Indian Creek reported one dead antelope that appeared to be an eagle kill and an unsuccessful attack by an eagle upon a yearling antelope. It is believed that golden eagles are quite numerous throughout the plains region of Montana. Many were observed in all the antelope ranges visited during the summer of 1947.

Ranchers reported some predation upon antelope by coyotes during past years. The amount of predation upon fawns was unknown but it was felt to have been significant. Coyotes made a few kills during the fall of 1946.

During the winter of 1947 the new poison "1080" was used experimentally in this area and the coyotes were nearly eliminated.

Sheep ranchers reported that coyotes had not bothered them since. This may result in a greater increase of antelope.

In the past some undetermined factors have apparently reduced the fawn crop considerably between the time that they are born and the following fall.

Other Losses

Antelope are sometimes killed when they break through fences after being run deliberately or accidentally ahead of cars on the county road which follows Little Missouri River. This condition might be improved if some well designed signs urging caution in the matter were placed along this road.

Antelope suffer some losses when they become caught in fences during the winter migration. Crusted snow cripples some antelope during the winter.

Poaching by out-of-state hunters was reported in the Little Missouri area. Dead antelope are found after each hunting season and some antelope are also crippled during the hunt.

NOTES ON RANCHER ATTITUDES

The importance of understanding the ranchers' attitude toward antelope on their ranges made a strong impression upon the fieldman during this study. Their reactions to the permit hunt is also important information.

Antelope Population

As has previously been mentioned, nearly all the ranchers seem to feel that antelope do little or no harm (visible competition with domestic

stock) to their ranges during summer. This is probably due to the evenly scattered condition of the herd during summer months.

The Little Missouri drainage has a sizeable winter concentration, but the residents of this drainage are more concerned over their winter antelope than are the residents of the other two main drainages. Some of the reasons for this are apparent. Sheep-tight fences and other fences, from Alzada to Capitol, hold groups of antelope which are trying to migrate. There is a considerable influx from South Dakota during certain years. In parts of the Little Missouri and of other areas where a heavy winter concentration is the usual condition and in addition there is often a rather large summer population -- the sentiment very often expressed by these ranchers is that they feel "there really are too many antelope" in their area.

In certain areas the only damage which is attributed to antelope is the trampling of fields and portions of pastures, in a manner similar to that of sheep.

Ranchers report varying degrees of damage to their alfalfa. Most of them are not familiar with the actual extent of damage. This information is needed and should be determined in future food habit studies. The results should be made known to the ranchers.

Ranchers who reside in areas of occasional heavy winter die-offs feel that some official agency should dispose of diseased and dying antelope.

Hunting Activity

Several hundred antelope are taken by permit in the Carter Area during the special antelope season. Many of the hunters are unfamiliar

with the area and have a limited amount of time to kill their antelope. Some careless hunting practices result and there is considerable resentment by ranchers to these. Ranchers especially resent excessive crippling of antelope by hunters who shoot into the herd and the possibility of livestock losses.

This is difficult to do in many instances, because of the character of the hunt, but this action would be beneficial to the hunters and is greatly desired by the ranchers. The rancher could caution the hunters not to shoot near livestock or buildings and to close gates. In some instances ranchers are able to move their stock into one pasture during the antelope season. This contact between rancher and hunter would help eliminate friction which exists between the two interests in some areas.

Many ranchers with posted lands said that they would be glad to have hunting on their range if the hunter would stop at their ranch house -- before hunting. Others expressed the desire to hunt with permit hunters, if they have time available -- or they would aid them by directions. Posted land in the Little Missouri area is being increased.

Some ranchers feel that application period for antelope permits should be more publicized in the Carter Area or by some other means the number of permits received locally should be increased.

Fine relations between antelope hunters and ranchers in Boxelder Creek-upper Crow Creek area and in the vicinity of the Pinyon Game Preserve is in quite striking contrast to the resentment commonly expressed by ranchers in the Powder River and the Little Missouri drainages.

The desirable attitude toward the hunt in the first mentioned area can probably be attributed to the activity of the Powder River-Carter Game Protective Association. Members of this Association are largely residents of the central area. Many of these ranchers look forward to the hunt because of the fine two-way cooperation that is common in this area. Pioneer members of this organization created the Piniele Game Preserve. The friendly attitude toward the antelope of these ranchers and others in the Carter area has made possible the large increase of antelope in this range in the last two decades.

The Department is fortunate in having the cooperation of this group. If similar hunter-rancher relationships and friendly attitudes toward antelope could be extended to other antelope ranges, it would be valuable to management.

GENERAL FIELD NOTES

Some interesting sidelights concerning antelope were noted in "Rancher Interviews". These may add to the general knowledge of Montana antelope.

An incident related by several different sheep operators is of some interest. Whenever lambs are suddenly awakened by anything which passes them in the night they will instinctively jump up and follow. There have been several such happenings in the Carter Area in which lambs followed an antelope several miles and herders believe that lambs have possibly been lost in such a manner.

Several ranchers offered the comment that the only effective way to determine antelope numbers is by the use of a small plane. These men have ridden in this country for years and realize the limitations of a

ground estimate. As they see it, the antelope is built for running and can be in the local drainage today and "over the hill" tomorrow -- and usually is.

There is some evidence that antelope use the winter migration routes during their return to summer range in spring. Many ranchers believe it is largely the same antelope which return to their range in summer. Two ranchers in different parts of the Boxelder drainage report the return to their range in successive years of "freak-horned" bucks. Does attempt to return to the exact area where they lived as fawns -- to drop their young according to an observation related to ranchers by early day Indian antelope hunters in northern Montana.

There was apparently an exceptionally heavy fawn crop during the spring of 1947. Single fawns are more the exception than the rule, according to ranchers. Antelope normally have twins. Buck (1947).

Antelope rarely jump fences. They usually jump between the wires or crawl under the fence. There are accounts of antelope having jumped fences more often recently -- than in past years. Rancher observation and personal observation reveal that the antelope's running gaits are similar to those of a horse. This and the past history of the antelope, on the Plains, may be a partial explanation for their reluctance to jump fences although they easily make long broad jumps.

During the migration, antelope are driven ahead of the severe storms. Sometimes they are driven by the storm front, but often they are observed moving westward before the storm strikes. In this way antelope play the role of a natural weather prophet. This behavior is also apparent after the antelope have moved into the winter range. They move into local shelter preceding stormy weather.

The relative times, at which the antelope hunts are held in South Dakota and Montana, may possibly determine the direction which antelope will move across the border. Some ranchers living on the east side of the Little Missouri report that during the fall of 1946 antelope moved into Montana as a result of the South Dakota hunt which they said, was earlier than the Montana hunt that year. Fall migration in this area is naturally a westward movement.

The coordination of hunting season dates between the two states might well be worked out to affect whatever movement may be mutually desired -- in management of the antelope.

The 1947 hunt date for South Dakota was the only one available at the time of writing. The 1947 antelope permit hunt in the Carter area was held September 28th to October 12th, while the adjacent South Dakota hunt was held October 1st to October 7th.

POPULATIONS

Antelope Population of the Carter Unit

Estimates of the number of antelope, which summer in the Carter Area, were made from data secured in "Rancher Interviews" and from data secured by the summer aerial count. The two population figures were arrived at independently. Figures secured from both sources were used to determine populations for each of the three drainage areas and these totals yield two estimates of antelope population for the entire Carter area. The methods used in both counts have been presented under the heading PROCEDURE.

1. The Little Missouri River, Owl Creek and Indian Creek area

includes 888 square miles of antelope range as seen on Map No. 1.

a. Total area covered by "Rancher Interviews" was 356 square miles. The ranchers estimated that 3,493 antelope are on their land during summer.

To allow for repetition of over-lapping antelope herds in ranchers' estimates; because only the areas where antelope were reported to be plentiful were visited and since main concentrations were dealt with -- the antelope numbers, estimated by the ranchers interviewed in each of the three main drainage areas, was used as the total figure for each area. (It was assumed that most of the best antelope range was covered.)

b. During the aerial survey, 118 miles were flown in this area and 252 antelope were counted:

$$\begin{aligned} 252 : 118 :: x : 888 \text{ square miles} \\ 118x = 223,776 \\ x = 1,895 \text{ antelope} \end{aligned}$$

Allowing 60% coverage of a flight path one mile in width, the estimate for this area is 3,162 antelope. The letter "x" represents the unknown total number of antelope in the area.

2. The Boxelder Drainage Area includes 552 square miles of antelope range.

a. Total area covered by "Rancher Interviews" was 211 square miles. The ranchers estimated that 1,760 antelope are on their land during summer.

b. During the aerial survey, 106 miles were flown in this area and 213 antelope were counted:

$$\begin{aligned} 213 : 106 :: x : 552 \\ 106x = 117,576 \\ x = 1,109 \text{ antelope} \end{aligned}$$

Allowing 60% coverage of a flight path one mile in width, the estimate for this area is 1,848 antelope.

3. The Powder River Drainage (east of Powder River) includes 619 square miles of antelope range.

a. Total area covered by "Rancher Interviews" was 419 square miles. The ranchers estimated that 2,590 antelope are on their lands during summer.

b. During the aerial survey, 80 miles were flown in this area and 325 antelope were counted:

$$\begin{aligned} 325 &: 80 :: x : 619 \text{ square miles} \\ 80x &= 200,275 \\ x &= 2,506 \text{ antelope} \end{aligned}$$

Allowing 100% coverage of a flight path one mile in width, the estimate for the area is 2,506 antelope. Coverage was figured as 100% because the flight lines follow major drainages. This was described in PROCEDURE.

The population estimated for Powder River may be too large since the percentage of total area which was covered by rancher interviews is larger than in the other two drainages. This may be seen in Table No. 1. In addition, the major portion of the flight lines in this drainage area were made in the better antelope ranges.

The antelope population in the Carter Unit, based on "Rancher Interviews", is 7,843. The antelope population in the Carter Unit, based on the aerial survey, is 7,516. Both of these estimates are probably too high, but they furnish a rough figure which can be checked by future counts.

Sex Ratios

Sex and age classes were determined and recorded for a small

number of antelope which were observed in the Carter area during the study.

The sample indicates:

47 Bucks)
62 Does)
59 Fawns)

Buck/Doe Ratio = 1/1.32
Doe/Fawn Ratio = 1/.95

TABLE NO. 1

TABLE OF ANTELOPE POPULATION IN THE CARTER AREA
(Based on "Rancher Interviews")

Drainage Area	Area in Sq. Mi.	Area covered by Interview	Percent of Total Area	No. of antelope Rancher Estimates
Little Missouri River	888	356	40	3,493
Boxelder Creek	552	211	38	1,760
Powder River	619	419	68	2,590
Entire Carter Unit	2,059	986	47	7,843

TABLE NO. 2

TABLE OF ANTELOPE POPULATION IN THE CARTER AREA*
(Based on the Aerial Survey)

Drainage Area	Area in Sq. Mi.	Miles flown	Percent coverage on a one mile flight path	Antelope Counted	No. of Antelope (Aerial Estimate)
Little Missouri River*	888	118	60	252	3,162*
Boxelder Creek	552	106	60	213	1,848*
Powder River	619	80	100	325	2,506*
Entire Carter Unit	2,059	304	—	790	7,516

*These figures are shown on Map No. 1.

It was impossible to distinguish between yearling and adult females. Since does are thought not to breed during their first year, the actual doe-fawn ratio is made less apparent in the preceding figures. This small sample is inadequate for the derivation of significant ratios. Additional sex ratio data is needed. Two reliable observers estimated a ratio of two bucks to three does.

The 1947 fawn crop was reportedly very good, with a large number of twins being reported. McLear (1944) and Carhart (1942) found that the majority of fawns were twins. A set of twin fawns are seen in Figure 4.

SUMMARY AND DISCUSSION

1. It should be emphasized that this report is based almost entirely upon information gained from "Rancher Interviews" that were made in the Carter Area during a short period in the summer of 1947.

2. Information concerning antelope migration, population distribution and any disease conditions was particularly sought during this study.

3. A characteristic snow condition in the Carter Area makes most of the food on the summer range unavailable during winter. This explains in part the local migrations to wintering areas of the main drainages, and the migrations which result in large concentrations of antelope near the Powder River.

4. The severity of the winter determines whether the winter migration is merely a partial shift to local winter ranges, a complete

movement to local winter ranges, or a longer movement from local ranges to more distant ranges that are used only during severe winters. The movement of antelope during "open" winters is local -- for the most part and long migrations usually occur during the very severe winters.

5. The winter migration pattern during severe years may be responsible for some re-distribution of antelope.

6. The heart of antelope summer range in the Powder River Drainage lies east of the Powder River County line.

7. Antelope winter range in the Powder River area forms a belt which lies parallel to and a short distance from the Powder River and extends somewhat up its main side drainages -- Timber Creek, Crow Creek, Pilgrim Creek, and Hay Creek.

8. Large numbers of antelope wintering in Crow Creek and the Powder River Breaks from the Pilgrim Creek region northward were indicated. The winter range concentration in lower Hay Creek should be re-checked.

9. Antelope summer in the Boxelder country in fairly large numbers. During open winters most of these antelope probably winter locally, while during severe winters there is some movement of antelope from the Boxelder drainage into the Powder River wintering area.

10. Antelope are normally in the Little Missouri area during both summer and winter. During very severe winters the antelope pass through this drainage from South Dakota and may leave the area. The South Dakota

antelope population, which is adjacent to the Carter herd, has experienced a large increase in recent years and its westward migration pattern explains the annual influx which is witnessed in Montana.

11. There is apparently little visible competition between antelope and domestic stock on the summer ranges. In the event of a dry weather cycle a large antelope population might provide excessive competition to domestic stock.

12. There are heavy concentrations on some of the winter ranges. The food, which is available on winter ranges during severe weather, may be a limiting range factor for the present antelope population. It should be determined whether there is an over-population at present or if the recent winter kills are sporadic outbreaks.

13. The average size of the ranches in the Carter area is about 15 sections. Cattle ranches comprise nearly all of the area of the Powder River drainage. In the Boxelder area about two-thirds of the ranches support sheep and the remainder have cattle. In the Little Missouri, about three-fifths are cattle ranches and about two-fifths sheep ranches. A considerable portion of the range is Federal grazing land.

14. A sample "Rancher Interview" form is included at the end of this report. The 46 completed Carter area forms are filed for future use. The District fieldman can refer directly to these for further detail.

15. Investigation of the northern edge of the antelope range in this unit was incomplete. Additional information is needed for the

Stump and Cabin Creeks vicinities. There are probably isolated populations south of Highway 212 which may, in time, become a part of this unit herd.

16. Some ranchers are very careful observers of antelope. It might be practical to ask certain "key" ranchers to make observations and collect desirable data at their convenience and on a year-around basis.

17. It might be possible to aid some antelope which become piled up against fences during a severe winter by driving them with a plane in such a manner that they can continue their migration without delays of several days.

18. Aerial censuses of antelope should be made from June 1st to June 15th, time of even distribution, if the best results are desired.

19. The area of best antelope range in the Carter Unit is limited to the north, south, and west by natural and artificial barriers. With current low decimating factors the present trend indicates a steady increase in numbers of antelope. Coyote population will continue to be low. This may reduce the loss from predation and as a result, the fawn crop may approach two per breeding doe.

20. The friendly attitude of Carter area ranchers toward antelope in this natural range results in a minimum amount of poaching and this may account for the greater population increase in this region than is found in adjoining areas.

21. Extensive pre-study planning should precede further investigation. A good outline of problems and procedures for future study can be

drawn up from the suggestions presented in Ken Thompson's 1942 report, suggestions taken from this report, and from the other antelope literature which is available.

A systematic approach in future work will aid in evaluating the 1947 study as to the quality and representative nature of the data gathered and will increase the value of any future investigations.

22. Additional information on the usual winter migration routes and the movements made during severe winters is needed.

23. Additional information on the dates and variation in spring migrations is also needed.

24. Although the local disease problem in lower Timber Creek was investigated and antelope here were not found to be carrying the disease (*Actinomyces necrophorus*) to the cattle, if a similar situation again arises another investigation will have to be made since the new conditions may be quite different. Heavy winter losses and the prevalence of disease in the future may be resented by the local ranchers or anyone else who has an interest in the Carter herd. The heavy winter loss of 1946-47 does not seem normal. Several ranchers indicated that the number of dead carcasses found following this winter was the greatest they have ever observed.

This heavy winter-loss evidence points to the possibility that there was a disease outbreak in the general area. This may have occurred as an aftermath of too great a concentration of antelope during a winter of adverse conditions.

25. The spring of 1947 was unusually wet, and such weather may have some effect on the prevalence of disease. Many lame antelope were observed. Such mechanical injury lends itself to the spread of disease.

26. Information which will aid in better hunter distribution should be obtained. Information which will improve the hunter-rancher relations should also be made available to interested groups. Public relations are an important factor in good management of the Carter antelope herd.

27. Additional predator loss data is needed. The importance of this factor and its relation to the antelope population trend should be determined over a period of years.

RECOMMENDATIONS

1. Year-around food habits data is needed. Any data which will supplement that already available would be especially valuable. Information pertaining to antelope use of alfalfa is desirable and such findings should be passed on to the ranchers.

2. Careful sex ratio and fawn crop data should be secured as soon as possible. This will aid in determining the trend of the herd. A buck/doe ratio of 1/1.32 from a small sample indicates a possibility for removing extra bucks.

3. A winter investigation in the Carter Area winter ranges to gather factual data of concentrations and winter mortality is very desirable. The reason for certain antelope dying in winters when there is apparently available food should be determined.

During a winter investigation the observer should attempt to determine the proportions of mortality which occur in the old age group, that are found among young antelope weakened during migration, and that which is accompanied by disease. Any indication of the presence of disease other than *Corynebacterium ovis* should be noted. The advisability of destroying diseased and dying animals by an official agency should be determined. It should also be determined if feed on the winter ranges is inadequate during severe conditions.

4. If future censuses support this summer's findings obtained through ranchers, that there are too many antelope in certain areas that have year-around concentrations, the permit kill should be increased. Live trapping may be necessary to relieve these concentrations in view of the fact that the number of special hunting permits have often been under-drawn in past years.

The desirable number of antelope to be maintained in the Carter herd must be determined at an early date.

5. Extensive trapping operations should be undertaken if a surplus of antelope in this area becomes more apparent and cannot be easily removed by hunting. The transplants should be made in areas entirely separate from the Carter unit.

Trapping and tagging of antelope in the Carter Unit is necessary if positive information is to be obtained on the migrations. This work should be done in cooperation with the South Dakota Game Department.

6. Additional recognition of the overall rancher point of view should be incorporated into management of the antelope herd.

Any information which the Department can supply the Miles City rancher group, which is interested in management, and the Carter-Powder River Game Protective Association will be useful in accomplishing this end. This may aid the hunter-rancher relations during the permit hunts.

July 1, 1948

Submitted by:
Gerald Salinas, Field Assistant
Wildlife Restoration Division

Figure 5. Sample: RANCHER INTERVIEW FORM

No. _____

Date _____ Rancher _____

Area _____ Specific Location _____

Summer Numbers _____ Damage _____

Winter Numbers _____ Damage _____

Disease and infections _____ When _____ Where _____

Degree _____ General _____

Sex ratio _____ Doe-fawn ratio _____ Twins _____

Singles _____

Antelope personally seen _____

Stock Numbers _____ Acres Number _____

Opinions in general _____

Migration Observation _____

Range condition _____

Domestic use _____

Winter Range Antelope Use _____

Remarks:--

Submitted by _____

BIBLIOGRAPHY

1. BAILEY, VERNON
1936--The Mammals and Life Zones of Oregon p. 70-75.
2. BEER, JAMES
1944--Distribution and Status of Pronghorn Antelope in Montana
Journal of Mammology 25 (1) : 43-46.
3. BUCK, PAUL D.
1947--The Biology of the Antelope (Antilocapra Americana) in Montana. Unpublished Master's Thesis for Montana State College.
4. BUECHNER, HELMUT K.
1947--Range Use of the Pronghorned Antelope in Western Texas, Trans.
Twelfth North Amer. Wildlife Confer. 185-192.
5. CARHART, ARTHUR H. AND KAUTZ, LORIN G.
1942--Antelope Survey Colorado Vol. 2
6. COUEY, FAYE M.
1946--Antelope Foods in Southeastern Montana
Jour. Wildlife Man. Vol. 10 (4) p. 367.
7. EINARSEN, ARTHUR S.
1938--Life History and Management of Antelope in Oregon, Trans.
Third North Amer. Wildlife Confer. 381-387.
8. McLEAN, DONALD D.
1944--The Prong-Horned Antelope in California
California Fish and Game Vol. 30 (4) p 221-241.
9. SKINNER, M. P.
1924--The American Antelope in Yellowstone National Park.
Roosevelt Wildlife Forest Experiment Sta. Syracuse, N.Y.
10. THOMPSON, KEN
1942--The Pronghorn Antelope in Montana--Life History Notes,
Restoration Division, Montana State Fish and Game Department

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

CARTER UNIT

ANTELOPE TRAPPING OPERATIONS INSPECTION
(Carter County)

DATE:

March 4 and 5, 1948

PURPOSE:

The antelope trapping crew operating in Carter County reported trouble finding antelope. It was requested by Director Cooney that someone fully acquainted with the area go to the site of operations and assist them.

PROCEDURE AND FINDINGS:

As time was all important it was suggested the trip be made by airplane.

Leaving Roundup in the early morning on March 4, a flight was accomplished to Albion. From here areas in which antelope were seen in large numbers, during the antelope census, were re-visited and the findings reported to the trapping foreman.

The area in which a large number of antelope were seen, was inspected by the crew on the ground and approved for a trapping site.

The trap was moved from its former location to the new site on March 5th.

Some difficulties in antelope trapping not formerly encountered were brought out in this operation. First the sheep fences in this area made it necessary to drive the antelope through gates and proved to be impractical. Antelope driven for the long period necessary to herd them through a gate and then again into the trap very often balked and refused to move.

Also the great numbers of sage grouse in this area gave the pilot a few anxious moments when they would flush during his low dives.

Last it was found the antelope would break up from large groups to small herds of only 5 to 10 when driven for long periods. Several theories were advanced on the reason for this and all seem to have merit.

1. The lateness of the season; the does are heavy with fawn and may make it difficult for them to keep up with the bucks and yearlings.

2. At every fence a few would fail to get through and further break up the group.

3. Ranchers report the normal migration is east at this time of year and it is difficult to drive them any other direction

CONCLUSIONS AND RECOMMENDATIONS:

It is concluded from the evidence now at hand, the most opportune time to trap antelope in this area is during late fall or during the winter migration. At this time the ranchers report antelope move westward in bands ranging from 50 to several hundred head.

Submitted by:

Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

May 6, 1948

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

CHOTEAU UNIT

HIGHWOOD MOUNTAINS INSPECTION

DATE:

May 19, 20, 21, 1948.

PERSONNEL:

Charles Loberg, Deputy Game Warden, Montana Fish and Game Department

Bert Goodman, District Ranger, U. S. Forest Service

Dan Massing, Assistant Ranger, U. S. Forest Service

Interested Ranchers of the area

Interested Sportsmen from Highwood Club

Don L. Brown, Assistant Big Game Leader, Wildlife Restoration
Division

PURPOSE:

The chief purpose of this survey was to gather all interested parties at the Highwood Ranger Station and inspect Highwoods Mountains' elk range. Then work out some form of plan from this inspection for management of the elk.

PROCEDURE:

Members of the U. S. Forest Service, Fish and Game Department and ranchers gathered at the Ranger Station in the evening of May 19th, and discussed plans for survey to begin on May 20th.

Ten riders left the Highwood Ranger Station at 9:30 A.M., and rode up the North Fork of Highwood Creek. The entire ride lasted 6 hours and it is estimated a distance of 20 miles was traveled. Most of upper Highwood basin was inspected relative to numbers of elk, available food and amount of forage use.

FINDINGS:

This area has had almost double the normal amount of rainfall this year and everything was looking good and very green. Evidence of moderate to heavy use of forage in some of the open parks, indicated numerous elk had been grazing there. Judging from the amount of elk droppings present, the elk must be quite numerous in this area. It is doubtful however, if the use by elk will slow the annual growth of vegetation to any great extent.

Although the clouds were hanging down on the higher elevations limiting the visibility, 47 elk and 15 deer were sighted.

Several old animals, probably bulls, were seen that appeared to be almost white. One group of 12 elk were seen at very close range and they appeared to be in very good condition. Of these 12 elk, 10 were obviously yearlings and the other two apparently cows.

One area that had been overgrazed to the point of erosion several years ago, then fenced, it was noted to be making a remarkable recovery. Ranger Goodman reports the plants that were sown in this protected area have been killed out by the native grasses. Goodman could

not recall the names of all the plants that had been used, but reports there was some crested wheatgrass which cannot be found now.

The snow was about gone except for a very few protected areas and the creeks were running high, but clear.

After the ride a discussion was held, and it was agreed by all present, that the Highwood Game Preserve should be abandoned to pave the way toward managing the elk.

If it is possible to abandon this Preserve, those present voted for a 30-day regular season on branch-antlered bulls -- also it was their recommendation the season on buck deer be opened with the elk season.

CONCLUSIONS:

It is concluded that there is not at present an overgrazed condition in the Highwood Mountains, but with a normal increase of elk it may present a dangerous situation under adverse conditions in a very short time.

It is assumed, because there has been no hunting in the area since 1935, that the sex-ratio is nearly equal. Therefore, there should be a surplus of harvestable bulls which could be removed to reduce the size of the herd.

RECOMMENDATIONS:

It is recommended a detailed survey of this area be made to determine the number of elk present and then attempt to hold this population slightly below its present size.

It is further recommended the Highwood Game Preserve be abandoned

to make it possible to harvest this surplus of bulls.

The recommended season is to begin October 15th, and extend until November 15th, with the restriction of shooting only branch-antlered bulls. It is hoped this will cause the hunters to look closely before they shoot and prevent the killing of cows.

During this season it is recommended the area be opened to hunting of buck deer also.

Estimates of elk populations for this area run from 350 to 400; actual counts vary between 200 and 275. The counts were made by pilots of the Highwood area.

Submitted by:

Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

June 4, 1948

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

MISSOURI BREAKS UNIT

AERIAL INSPECTION OF FORT PECK GAME RANGE

(Phillips and Fergus Sub-Units)

DATE:

February 23, 24, 25, 1948

PERSONNEL:

Tom Horn, Manager, Fort Peck Game Range

Cliff Wolf, Patrolman, Fort Peck Game Range

Don L. Brown, Assistant Big Game Leader, Wildlife Restoration
Division

PURPOSE:

Previously an aerial inspection of the deer population was made on the Fort Peck Game Range in September of 1947. At the time of this inspection, the foliage was still on the trees, thus obstructing to some extent a vertical view. Because of this fact, it was assumed that part of the deer had not been observed.

The primary purpose of this inspection was to check the findings of the September 1947 census.

PROCEDURE:

Members of the crew from the Game Range set up a camp and a re-fueling station at the Balke Ranch; the plane, furnished by the

Restoration Division, was flown to that base on February 23rd.

The initial flight was made to census white-tail deer on the south side of the River during the early morning of February 24th, and a second flight for the Phillips County side of February 25th.

The remaining portion of each day was spent counting antelope and mule deer in the surrounding breaks or in making ground inspections.

FINDINGS:

In the count of white-tail deer made last September, the Fergus County side of the River had a larger deer population than the Phillips County side, but the reverse was true during the February inspection. However, because the River was frozen, it was possible for deer to move freely from one side to the other.

The fact that there were more deer on the south side of the River than on the north side could be attributed to the more easily accessible browse species on the southern exposures during the winter months.

Ground inspections revealed no evidence of any over-use of browse plants on either side of the River.

It was noted that most of the bucks had shed their antlers, making it practically impossible to distinguish between sexes or between adult deer and fawns. However, a few white-tail and several mule deer bucks were seen that had not shed their antlers.

The antelope count in the Chain Buttes area, of northeastern Petroleum County, revealed there were more antelope than formerly estimated.

FLIGHT I

AREA COVERED:

Missouri River flood plain, from headwaters of Fort Peck Lake to the western end of the Game Range, on the south side of the River.

FLYING TIME:

Forty-five minutes.

MILES FLOWN:

Fifty to 60 miles (estimated).

FLIGHT OBSERVATIONS:

Species	: : Unclassified :	: : Bucks with antlers :
White-tail deer	: : 31 :	: : 12 :
Mule deer	: : 2 :	: : 0 :

SUMMARY:

Total square miles of flood plain above headwaters of the lake- - - - - 10 sq. mi.

Total square miles of flood plain estimated covered by flight path- - - - - 8 sq. mi.

Total number of deer seen on flood plain- - - - - 45 deer

Estimated population of deer in Fergus County (45 x 1.25)- - - - - 56 deer

Deer per square mile of flood plain - - - - - 5.6 deer

100% of deer in flight path considered observed.

FLIGHT II

AREA COVERED:

Chain Buttes area in Petroleum County. Part of which is in the Game Range and part is not.

FLYING TIME:

One hour and 45 minutes.

MILES FLOWN:

135 to 150 (estimated).

FLIGHT OBSERVATIONS:

Species	: Does and Fawns :	: Bucks :	: Unclassified :
Antelope:	:	:	:
Group 1	: 12	: 8	: 0
2	: 59	: 12	: 0
3	: 37	: 6	: 0
4	: 18	: 4	: 0
5	: 4	: 4	: 0
6	: 17	: 3	: 0
7	: 0	: 0	: 53
Total	: 147	: 37	: 53
Deer	: 0	: 0	: 23

ANTELOPE SEX-RATIO:

One buck to 3.97 doe.

SUMMARY:

Total square miles censused in Chain Buttes Area- - 60 sq. mi.

Total number of antelope seen- - - - - 237 antelope

Antelope per square mile in this area- - - - - 3.9 antelope
 100% of antelope considered observed in this area.

FLIGHT III

AREA COVERED:

Missouri River flood plain, from headwaters of Fort Peck Lake to the western end of the Game Range, on the north side of the River.

FLYING TIME:

Thirty minutes.

MILES FLOWN:

Thirty-five to 40 miles (estimated).

FLIGHT OBSERVATIONS:

Species	:	Unclassified	:	Bucks with antlers
White-tail deer	:	68	:	1
Mule deer	:	4	:	

SUMMARY:

Total square miles of flood plain above headwaters of the lake- - - - - 5 sq. mi.
 Total square miles of flood plain estimated covered by flight path- - - - - 4 sq. mi.
 Total number of deer seen on flood plain- - - - - 73 deer
 Estimated population of deer in Phillips County (73 x 1.25)- - - - - 91 deer
 Deer per square mile of flood plain- - - - - 18.2 deer

100% of deer in flight path considered observed.

FLIGHTS IV AND V

These flights were made in an attempt to census mule deer in the breaks area, but they had to be abandoned because of poor visibility.

The mule deer blended so well with the dead grass and bushes that they were extremely difficult to distinguish.

CONCLUSIONS:

It is concluded the aerial census method for deer is very satisfactory in determining sex-ratio, but it is less reliable when used for total population counts during this season.

The September aerial count for the flood plain of this area was 114 deer, the estimated population being 171 deer. The February count for the same area was 118 deer, and the estimated population was 147 deer.

Ground counts on deer of the flood plain agreed favorably with the aerial counts except in one instance; that is 7 deer (white-tail) were counted from the air, while 41 were counted in the same area from the ground in the evening.

SUMMARY:

<u>September count</u>	<u>February count</u>
114	118 152*
<u>September estimated Population</u>	<u>February Estimated Population</u>
171	145 202*

(*) Corrected to include known error of 34 deer on Hutton bottom;

41 deer were counted from the ground and only 7 were counted from the air.

RECOMMENDATIONS:

The work on deer census, that has been completed in this area, will be very helpful in determining the future use of aerial deer counts; therefore, it is recommended that this area be periodically censused to gain further information and to improve our censusing technique.

Opinions and recommendations relative to the 1948 big game season, formed as the result of the September, 1947 survey, have not been altered by this inspection.

Submitted by:

Don L. Brown, Assistant Big Game Leader
Wildlife Restoration Division

July 1, 1948

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

MISSOURI BREAKS UNIT

GARFIELD COUNTY RANCHER-SPORTSMEN MEETING

DATE:

February 21, 1948

PERSONNEL:

Faye M. Couey, Big Game Leader, Wildlife Restoration Division

Don L. Brown, Ass't. Big Game Leader, Wildlife Restoration
Division

PURPOSE:

For the past several years it has been the desire of the Montana Fish and Game Department, the Fish and Wildlife Service and interested sportsmen's groups, to experiment with re-establishing an elk herd within the boundaries of the Fort Peck Game Range.

On the theory the elk may migrate to private lands surrounding this area, the Department wanted this project sanctioned by the ranchers living within the area.

With the purpose in mind of discussing and receiving an opinion from these ranchers regarding the elk plant, the above mentioned personnel attended this meeting.

PROCEDURE AND FINDINGS:

The President of the club opened the meeting for discussion and each rancher was asked to express his views on the subject of elk planting. After a lengthy discussion, in which both the ranchers, sportsmen, and Fish and Game personnel expressed their views, the question was brought to a vote.

Only the ranchers living within the area considered to be elk habitat were allowed to vote; the result was an 8 to 8 tie for and against planting of elk. No attempt to break this tie was made as only an expression of opinion was the object of the meeting.

An additional subject discussed and brought to a vote was whether or not the Snow Creek Game Preserve should be abandoned; they voted to start a petition for its abandonment.

CONCLUSIONS:

The discussion indicated that four ranchers were very definitely opposed to planting elk, four were non-committal, but voting against it for their own protection later, (as they stated it), and the other 8 men were very anxious to try the experiment.

It is concluded that the majority would like to see the elk re-established in this area if they had assurance the elk would not bother their crops or haystacks; or if they were certain action would be taken immediately to relieve any damage they may receive from the elk.

However, as this is to be an experiment it would be better to try the elk plant on a relatively small area and expand or detract from that plant.

RECOMMENDATIONS:

The area lying between Hell Creek and Snow Creek is representative

of the entire area and all the ranchers living within this area voted to try the elk plant. Therefore, it is recommended approximately 20 elk be planted here to test the feasibility of additional plants.

This area is bounded on the north by Fort Peck Lake and on the east by water backing from the lake up Hell Creek, on the south there is open country back from the breaks which may tend to hold the elk in the protective cover.

It is further recommended the Snow Creek Game Preserve be abandoned, its purpose has been a point of conjecture for many years, and the ranchers are petitioning to have it opened to hunting.

May 6, 1948

Submitted by:

Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Eastern Montana)

DATE July 15, 1948

MISSOURI BREAKS UNIT

NOTES ON BIGHORN SHEEP PASTURE INSPECTION AT BILLY CREEK

Due to a very inclement weather in the form of high winds and rain, a very hurried inspection of the Rocky Mountain bighorn pasture was made by Cliff Wolf of the Fish and Wildlife Service and Don Brown of the Wildlife Restoration Division.

The primary purpose of this inspection was to determine if the ewes had started to drop their lambs and if any repair was needed on the fence.

Two large rams were seen near the northwest corner of the pasture, and the remaining 13 sheep were sighted in the rough area near the southeast corner. All were lying down in open country when first seen at 7:30 A.M., and as they jumped and ran they appeared to be in very good condition.

Two of the three water holes were visited and there was no indication that they had been used by the bighorns.

Some of the southern slopes where the grass was getting green appeared to have been used by the bighorns and the Yucca appeared to have been browsed rather heavily.

Mr. Wolf reports he first saw rutting activity on December 2nd, 1947, and it extended into the first part of January, 1948. According

to Mr. Faye Couey's study on Rocky Mountain bighorns, the lambing season should begin after the middle of May.

No repair on the fence was needed.

May 6, 1948

Submitted by:

Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

STATE Montana
PROJECT 1-R (Eastern Montana)
DATE July 15, 1948

YELLOWSTONE UNIT

RANCHER INTERVIEWS ON SWEETGRASS COUNTY ANTELOPE SEASON FOR 1948

DATE:

May 1, 1948

PERSONNEL:

G. O. Johnson, Deputy Game Warden, Montana Fish and Game Department
Don L. Brown, Ass't. Big Game Leader, Wildlife Restoration
Division

PURPOSE:

With an antelope season in all surrounding counties and only part of Sweetgrass County open to hunting, several ranchers reported migration of these animals to the protected area of Sweetgrass County.

Last year at the request of the Big Timber Rod and Gun Club and several land-owners, part of Sweetgrass County was left closed. This year due to an apparent increase in antelope, one rancher requested it open.

It was the purpose of these interviews to determine whether it should be opened or closed; it was known there were sufficient antelope to warrant a hunt, so only the consent of the ranchers within the area was needed to recommend it be opened.

PROCEDURE AND FINDINGS:

The first man contacted was Bob Hart, rancher and president of the Big Timber Rod and Gun Club. His opinion was that the club would approve the opening of this area if it were approved by the ranchers within the area.

By talking to Victor Tronrud, owner of a section in the area in question, we learned that there were only two other land-owners concerned. Mr. Tronrud's opinion was it would be alright with him to open the area if the other two thought it advisable.

Mr. Brannin, Manager of the Stevens ranch, had already made a request to the Deputy Game Warden for an open season and that left only Mr. Glennie to be interviewed.

Mr. Glennie was of the opinion the antelope were becoming too thick and would like to see them thinned out by hunting, but didn't want an open season if it were not agreeable to the other two ranchers in the area.

CONCLUSIONS AND RECOMMENDATIONS:

It is concluded that this area would warrant an open season on buck antelope and would prevent an influx of them into this area during the hunting season.

In all probability there is a definite migration into this Porcupine Butte region during the hunting season, but it is doubtful if they stay after the season is past.

There are indications of more antelope here now than in years before, but this could be due to a natural increase.

It is recommended that this area, known as Porcupine Butte, be

included in the Sweetgrass County antelope season.

It is recommended that all of that portion of Sweetgrass County lying north and east of Sweetgrass Creek to the Victor Tronrud Bridge and south and east of the road from this bridge to the Wheatland County line be opened to antelope hunting from October 17 to October 24, 1948, 100 buck antelope to be taken on a permit basis.

Submitted by:

Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

May 4, 1948

STATE Montana

PROJECT 1-R (Game Birds)

DATE July 15, 1948

STATE-WIDE

SURVIVAL STUDIES ON GAME FARM RAISED PHEASANTS IN MONTANA

DATE:

July 29th - December 24, 1947

PERSONNEL:

Wm. R. Bergeson, Game Bird Leader, Wildlife Restoration Division

Robert J. Greene, Fieldman, Wildlife Restoration Division

Fred L. Hartkorn, Field Assistant, Wildlife Restoration Division

Lester Barton, Foreman, State Game Farm, Warm Springs

J. R. Wells, Foreman, State Game Farm, Billings

Truce Emmett, Deputy Game Warden, Montana Fish and Game Department

R. S. Sullivan, Caretaker, State Game Farm, Moiese

Fairfield Bench Study Area

The Fairfield Bench Study Area, approximately 8 miles wide by 14 miles long, is located in southeastern Teton County, Montana. It is one of the most ideal ring-necked pheasant habitats in the State. The majority of the land is under irrigation. Grain crops are raised on 44% of the land, alfalfa and other hay on 18.5%, peas and sugar beets

on 3.5%. The remaining 34% is utilized in lesser crops, pastureland, roads, ditches, farm yards, etc. The average farm unit consists of about 90 acres. This creates a rather uniform crop pattern over the entire irrigated area.

The first ring-necks were introduced to the Fairfield Bench in 1936 when 60 pen-raised birds were liberated there. Small numbers of game-farm birds have been placed in this area each year since that time. In 1943, 2,834 wild pheasants, obtained by live trapping principally in the Milk River Valley, were added to the practically non-existent pheasant population. In 1946, 365 live-trapped birds were liberated on the Bench. 1947 was the first year that any appreciable number of pen-raised pheasants were released in this area. Roughly 1,500 birds were liberated in the Fairfield Bench area in mid-summer. The excellence of the habitat is shown by the fact that well over 2,000 cock pheasants were harvested here during the past hunting season.

This area was considered ideal for a study of this type because hunting pressure was expected to be very heavy, making it likely that a relatively large number of banded birds would be bagged. Also, the nature of the area made it possible to get almost a 100 percent check of all hunters in the area by means of a single highway checking station, thereby aiding in recovery of bands.

The Fish and Game Commission has created six bird refuges on the Fairfield Bench Area. These areas, averaging about 90 acres, are closed to all game bird hunting and are posted with warning signs. These closures include some of the best pheasant habitat in the area and offered an opportunity to gather information as to the value of

small refuge areas in increasing survival of game farm pheasants.

PURPOSE:

1. To determine the hunting returns on 8 and 9 week old pheasants released in mid-summer.
2. To determine the value of small refuge areas in increasing survival.
3. To gain information as to survival rates of 8 and 9 week old pheasants.
4. To study difference in survival following different release methods.

PROCEDURE:

On August 5th, 1947, five hundred banded pheasants, nine weeks of age, including 239 cocks, were released at 8 different stations. Five of these release stations were within administrative closures. By this, it was hoped to establish the value of making releases within closures. Local sportsmen were allowed to release these 500 birds in any manner they pleased, in order to provide information which might be of value in improving the release methods. However, the releases were made in such a manner that except for the mistake of urging the birds out of the crates and consequently causing many of the birds to fly and scatter widely, we were unable to greatly improve their method.

The entire procedure, including banding, loading, transporting, and releasing required a total time of 21 hours 45 minutes. Of this time, 9 hours were spent in traveling from Warm Springs game farm to the Fairfield Bench. The temperature during the entire process ranged from 62° to 76° F.

A detailed record of the band numbers, sex, weather conditions, cover types where liberated, and exact liberation sites were recorded on a special form.

On August 7th, 1947, 501 banded pheasants including 225 cocks were liberated on the Fairfield Bench. Of the 225 cocks, 75 were 8 weeks of age and the remaining 150 were 9 weeks of age. By releasing the two age groups under as near identical conditions as possible, it was hoped information might be gained on the survival of the two age groups. These birds were released at seven different release stations, none of which were within administrative closures, but all were considered to be comparable to the eight stations described for August 7th release.

Nine-week old birds were released at four stations, 8-week old birds at two stations, and 8 and 9-week old birds at one station. Release methods were identical to the ones used on the previous releases except more care was exercised to avoid exciting the birds, which had caused them to fly and scatter as the crates were opened. The birds were allowed to leave the crates at will, and in two cases the crates were left open for about three hours. At the end of this time, several birds still remained in the crates. Few of the birds flew upon being released and widespread scattering was held to a minimum.

Slightly less time was required for the banding, transporting and other procedures than was required for the previous release. The entire process took 18 hours and 10 minutes from starting of banding until all the birds were released. The trip from Warm Springs Game Farm to Fairfield required only $7\frac{1}{2}$ hours and was made over a slightly shorter

route. Temperature ranged from 46° F to 110° F; the higher temperature having been taken in the sun at the finish of the liberating process.

As before, a complete, detailed record was kept on a special form of all band numbers, release sites, etc.

FINDINGS:

Since band returns from cocks bagged during the eight-day season October 26th to November 2nd, 1947 are the only source of information on these studies, it is not intended that these figures be interpreted as a quantitative measurement of survival. They serve only as an indicator of survival in the various classes. Results are summarized in Table 1; numbers and percentages cited are for male birds only.

Table 1

	Number Released	Number of Bands Returned	Percent Return
<u>August 5th Releases:</u>			
Males, released in Closures	142	22	15.5
Males released outside Closures	97	6	6.2
Total	239	28	11.7
<u>August 7th Releases:</u>			
9 week old males	150	24	16.
8 week old males	75	10	13.3
Total	225	34	15.1
Total Both Releases	464	62	13.4

Hunting returns from the various classes used in this experiment

ranged from 6.2 to 16 percent, with an average return of 13.4 percent. Game farm birds provided only 2.5 percent of the total kill on the study area. Based upon results obtained from experiments of this type in other parts of the country, band returns were comparatively high for pen-raised birds released from $2\frac{1}{2}$ -3 months prior to the opening of the hunting season. This relatively high return is undoubtedly due to several factors, including heavy hunting pressure, the checking station method of band recovery, and the ideal habitat for pheasants which this study area provided. If it is assumed that hunting returns are an indicator of survival, the most outstanding fact brought out in this experiment is the great variation shown in the survival of these birds at the different release stations. (See Table 2).

Table 2

Release Station: Number	Closure	Number of Males Released	Number of Bands Returned	Percent Return
<u>August 5th:</u>				
1	Yes	12	2	16.7
2	No	22	4	18.2
3	Yes	44	4	10.0
4	Yes	29	6	20.7
5	No	46	2	4.3
6	No	29	0	0.0
7	Yes	26	5	19.2
8	Yes	35	5	14.3
<u>August 7th:</u>				
9	No	45	10	22.2
10	No	23	2	8.7
11	No	68	13	19.1
12	No	23	3	13.0
13	No	24	3	12.5
14	No	22	1	4.5
15	No	20	2	10.0
Total		468	62	

In an area such as the Fairfield Bench where the crop pattern is highly uniform, and where release sites appeared to be highly similar, the band returns varied from 0 to 22.2 percent. Some variation may be caused by differences in hunting effort in the different areas. However, since hunting pressure was heavy throughout the entire area, it is the opinion of the observers that it would tend to be uniform and have little influence upon the variation in the returns. This is further brought out by the fact that the band recovery was highest from birds released in the small refuge areas where no hunting was permitted. Therefore, it seems logical to believe that the variation shown in Table 2 is due more directly to survival in the various groups released, and hence basically to environmental factors that are not apparent when choosing a release site. More study of this subject is necessary to determine these factors. If such variation exists within one seemingly homogeneous area, it is to be expected that variation in survival would be even more pronounced in different areas of the State which have highly differentiated environmental conditions.

When hunting returns are used as a basis for survival studies, the question naturally arises as to the number of game farm pheasants that survived the hunting season. Information on this subject is given later in the section on the Moiese study.

The figures in Table 1 indicate that the hunting return and presumably the survival rate of pen-raised pheasants, is increased by releasing the birds within small refuge areas. This fact is even more significant when one considers that hunting was not permitted on these refuge areas, therefore, hunting returns would be expected to be relative-

ly low. The higher return, therefore, probably can be attributed to higher survival brought about by the more suitable habitat found within the refuge areas. It is believed that an intensive cover and food development program within these areas would further increase their value as sites whereby game farm birds could be released with a higher expected survival rate.

A slightly higher return was obtained from the birds released at 9 weeks of age, compared with the 8-week age group, as shown in Table 1. However, this difference cannot be considered significant as it is believed that the numbers used are not sufficiently large, and when both releases are combined, it is found that the returns from the two age groups are identical.

The only differences in the handling and release methods used between the August 5th and August 7th groups were that the August 7th release required slightly less time for banding, transporting and liberating, and more care was taken on August 7th to prevent exciting the birds to the point of flying and scattering widely. Birds released on August 5th had the advantage of less temperature variation during the entire process and also, many of these were released within refuge areas where it has been shown that returns were greater. In spite of this, the return figures in Table 1 show a significant difference. Apparently, since more care was exercised during the liberating process and slightly shorter time required in transporting, the hunting returns were favorably increased.

It seems evident from this study that since single factors; such as, refuge areas, and better release methods can appreciably increase the

hunting returns of game farm pheasants, a combination of such factors are potentially capable of increasing the value of the game farm pheasant to the hunter.

Moiese Bird Farm Study Area

The Moiese Bird Farm Study Area is located in the Flathead Valley in southwestern Lake County, Montana. It consists of 80 acres of irrigated land fenced with a six foot semi-predator proof fence. The area includes about 20 acres of alfalfa hay, 10 acres of barley, and the remaining 50 acres includes mixed native grasses and dense sweet clover and weeds. Intensive diversified farming is carried on in the surrounding locality with alfalfa hay, grain, and sugar beets being the main crops grown. The entire Flathead Valley creates a relatively ideal pheasant habitat, supporting a fairly heavy pheasant population.

PURPOSE:

1. To determine the survival rates of game farm raised pheasants.
2. To determine if survival of game farm raised pheasants could be increased by temporary supplemental feeding and predator control on the release area.
3. To determine if possible if pheasants raised with domestic hens were more adapted to the wild conditions encountered following release and hence have a higher survival rate.

PROCEDURE:

Three separate releases of pen raised birds 8 weeks of age were made on the study area. All birds were banded and band numbers recorded

to provide a means of identification. Releases were made under the following conditions.

On August 12th, 1947, 215 pheasants from the Warm Springs Game Farm were released on the study area by local sportsmen. The birds appeared to be in good condition at the time of release.

On August 16th, 1947, 300 pheasants from the Warm Springs Game Farm were released on the study area. These birds were liberated at the same place as on the August 12th release. Handling and release methods were identical to the above release except that some supplementary feed was provided in feed boxes scattered about the release area and some feed was scattered on the ground. The same feed that the birds had been fed at the game farm was provided until September 14th. This consisted of cracked wheat and turkey growing pellets. It was thought that information might be gained as to the value of supplemental feeding in this release method.

On August 27th, 1947, 100 birds from the Billings game farm were released on the study area. Banding was done at the time of release. The time in transit for these birds was much longer due to the increased distance and required 12 hours, in contrast to 4 hours travel time on the other releases. Travel was done at night, however, and the liberating was completed at the same time as on the previous releases. It was hoped to gain information as to the survival of birds raised with domestic hens from this study.

Survival data on the three releases were obtained by periodically searching the area for dead birds prior to the hunting season, from hunting season band returns, and by live trapping birds in the study

area during the winter months. It was thought that these procedures would furnish a more complete picture of survival in conjunction with the Fairfield Study where hunting season band returns furnished the only data on survival. Hunting season band returns on the Moiese study area would be expected to be relatively low due to the area being closed to hunting. However the Fairfield study has shown that higher hunting returns were obtained from birds released on refuge areas where no hunting was permitted.

A detailed discussion of bird behavior and causes of mortality has been given in a previous report and will not be included here.

FINDINGS:

Periodic searches for dead birds were made over the study area up to November 3rd. Only dead birds bearing bands were recorded. It is believed by the observers that many dead birds were not found due to the dense vegetative growth on the study area. Results of these searches are given on Graph 1 as percentages of the total number of birds in each release by number of days following release.

A total of 119 or 19.3% of the 615 pheasants released on the study area are known to have perished prior to the hunting season, and were actually found dead within the fenced area. It is believed that some dead birds were not recovered within the area. In addition, an undetermined number of other experimental birds probably left the area completely and consequently no data were obtained. The majority of the deaths were believed to have resulted from the inability of the pen-raised birds to become accustomed to the wild environment.

Predators accounted for a number of the deaths in spite of the

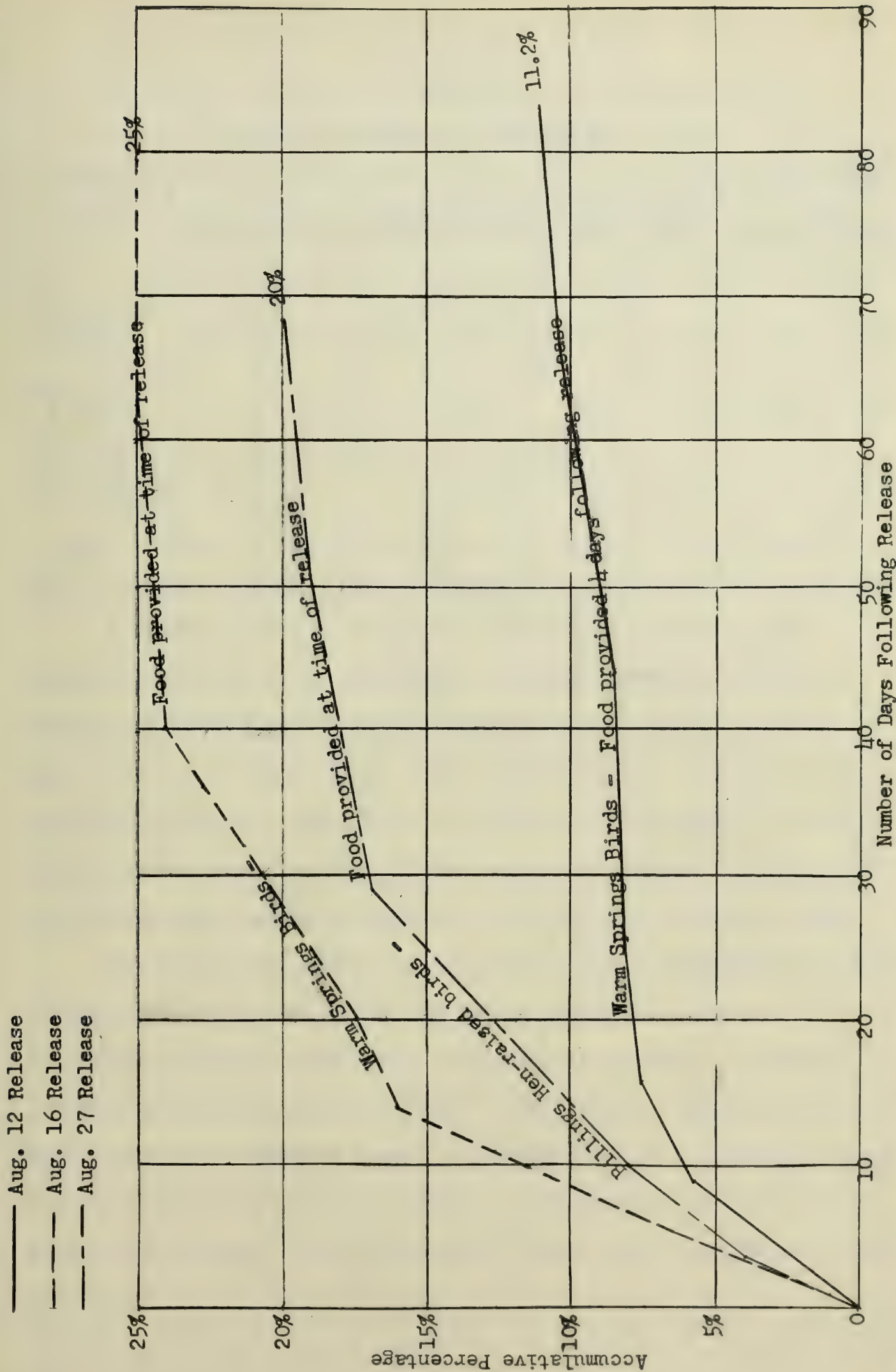
fact that the area was enclosed by a semi-predator proof fence, and that the caretaker of the area carried on an intensive predator trapping and hunting program throughout the summer.

Bands from 21 birds or 3.4% of the total birds released on the Moiese study area were recovered during the hunting season. This return is considerably lower than on the Fairfield study area and may be partly due to less hunting pressure in the immediate vicinity of the Moiese study area and to the fact that bands could not be recovered at a checking station. Table 3 summarized hunting season returns from the different releases.

Live trapping of pheasants on the study area was carried on during February and March to determine the number of game farm birds present. A very mild winter with very little snow made trapping difficult since an abundance of food was available throughout the winter. However, 72 pheasants were trapped on the area, 45 of which were identified by bands as being pen-raised birds. All the birds had not been trapped on the area by the time trapping was discontinued. This was determined by marking each bird as it was trapped by clipping the wings on the hens, and the tails of the cocks. With weather conditions becoming less favorable for trapping, as the season advanced, this activity was discontinued.

Trapping results are also presented in Table 3.

GRAPH 1



PERCENT OF PEN-RAISED BIRDS FOUND DEAD BY NUMBER OF DAYS FOLLOWING RELEASE

Table 3

PHEASANTS RECOVERED ON MOIESE STUDY AREA

Date	Dead Recovered		Hunter Returns		Live Trapped		Total	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
August 12 Release	24	11.2	12	5.6	12	5.6	48	22.3
August 16 Release	75	25	5	1.7	17	5.6	97	32.3
August 27 Release	20	20	4	4.0	16	16.0	40	40.0
Total	119	19.3	21	3.4	45	7.3	185	30.0

A partial record of the fate of pen-raised pheasants after liberation is shown here. Although an average recovery of 30 percent leaves many birds unaccounted for, a fair picture results, and tends to form a basis for further study on what becomes of the birds and consequently, methods by which survival rates may be increased. As many or more birds are shown to have perished before the hunting season as were killed during the season and trapped on the area the following winter.

Results of this study tend to indicate that supplementary feeding of the birds at the time of release had no beneficial effect in increasing survival. Here again, more study is necessary. However, trapping returns on the area further substantiate the earlier conclusion that supplementary feeding tends to hold the birds in the immediate area, and may account for the higher number of dead birds recovered from the August 16th release, since 5.6 percent of each group were trapped during the winter.

The advantage of game farm pheasants raised with domestic hens compared with those artificially reared in brooders is indicated by the larger number of birds from the August 27th release that were trapped during the winter. However, the fact that only 40 percent of the birds were accounted for makes it possible that other factors might enter into the picture. Again, further study is necessary.

RECOMMENDATIONS:

In order that more information be secured on the subject of survival and ways in which the survival rate of game farm birds may be increased, more study is necessary. If these studies could be repeated, more definite conclusions could be drawn.

May 25, 1948

Submitted by:

Robert J. Greene, Fieldman
Wildlife Restoration Division

STATE Montana

PROJECT 1-R (Game Birds)

DATE July 15, 1948

STATE-WIDE

EXPERIMENTAL PLANTINGS OF SAFFLOWER AND MULTIFLORA ROSE SEED

FOR GAME BIRD FOOD AND COVER

Safflower:

In order to determine the value of safflower plantings as a food and cover crop for upland game birds, 680 pounds of clean safflower seed was purchased from Mr. Lester Tague at Intake, Montana, at a cost of 13¢ per pound. The seed was distributed to farmers in various areas of the State who agreed to make trial plantings on small areas. In addition, two acres were seeded to safflower at the Moiese Bird Farm and about 3 acres at the Fort Peck Bird Farm. Since Mr. Tague advised us that the plant would not do well at elevations over 3,000 feet, the areas chosen for planting were located at different elevations as well as in areas where pheasants are relatively abundant. The experimental areas and their elevations where plantings were made are as follows:

Operator	Area	Elevation	Acres Seeded
Goffena	Musselshell	2,700	Approx. 1 acre
Lewellen	Grass Range	3,480	3/4 acre
Capser	Harlowton	4,300	1/2 acre

(Continued)

(Continued)

Operator	Area	Elevation	Acres Seeded
Halberg	Helena	4,157	1/2 acre
Bailey	Fort Peck	2,000	3 acres
Ken Homer	Charlo	2,850	1/2 acre
Noel Tougas	Pablo	2,850	1/2 acre
Sullivan	Moiese	2,800	2 acres

Plantings will be checked throughout the summer and winter to determine the crop condition at the various sites and the utilization by game birds. Remaining seed will be held over for planting next spring.

Multiflora Rose:

Approximately 5# of Multiflora Rose seed was obtained from the Nebraska State Game, Forestation and Parks Commission for trial plantings in Montana. Seed was distributed to the State Nursery at Helena and to the Forestry School Nursery at Missoula. Approximately 1/2 pound of seed was given to each nursery. This would produce about 20,000 seedlings at each nursery if successful. The remainder of the seed will be held over for future plantings.

Submitted by:

Robert J. Greene, Fieldman
Wildlife Restoration Division

June 10, 1948

STATE Montana

PROJECT 1-R (Statistics)

DATE July 15, 1948

STATE-WIDE

CUMULATIVE RECORD OF BIG GAME DATA

Since 1943 estimates of big game numbers have been compiled on a unit basis by men in the field who are in the closest contact with the game and represent our most reliable source of information. This system was organized by Forest Service and State Fish and Game personnel at that time with the view in mind of classifying big game ranges according to logical drainage units and avoid political boundaries.

The plan involves an annual get-together of local Deputy Game Wardens, and Forest Rangers, usually directly following the hunting season, and through their intimate knowledge of the unit, they arrive at a mutual agreement regarding the data to be collected. This necessarily involves considerable guesswork, but it has been the hope that following this up year after year, using checking station records, census methods and collecting all additional information on the subject, that we may arrive at a reasonable approximation of total numbers. It is felt that this is being accomplished and that the attached tables indicate a fair estimate of game populations in the State.

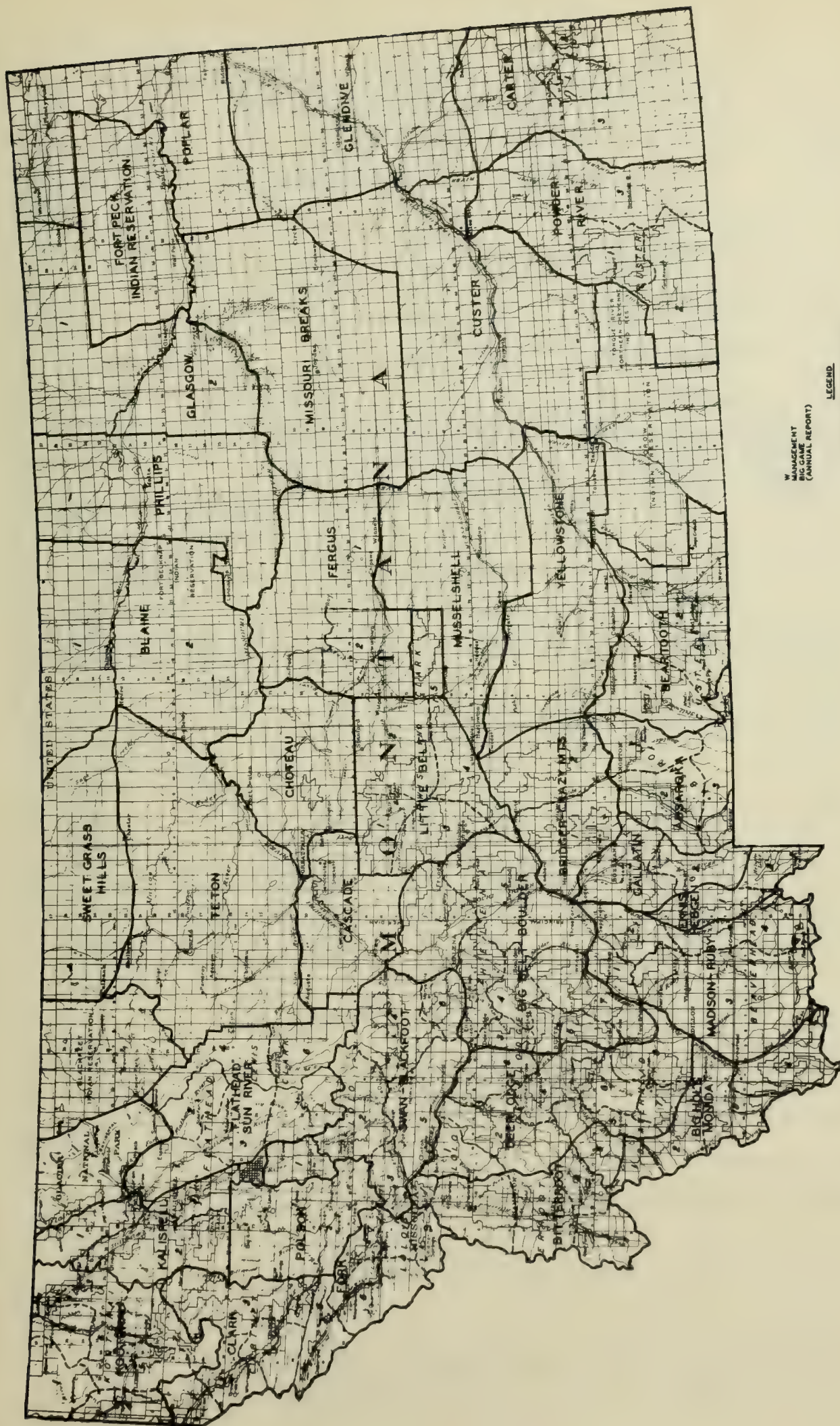
The accompanying map shows the 39 units with their sub-units. Included are Park Service, Indian Service and Fish and Wildlife Service lands. Representatives of these agencies were contacted when these data

were collected. Of note is the fact that only that portion of the Yellowstone Park Northern Elk Herd that winters in Montana, outside of the Park, is included in the report (Absaroka Unit).

The accompanying Annual Big Game Report Form shows the method of recording data for each sub-unit. Instructions for completing the form are on the back.

The column on estimated capacity of the winter range in animal months on the Cumulative Record Form may be hard to reconcile with the other columns. This is because the number of months use varies in different sub-units and when compiled there seems to be little relation between the estimated capacity of the winter range in animal numbers and the estimated capacity of the winter range in animal months. A study of the sub-unit report form will clarify this and, the following Table may help explain.

Absaroka Unit	Capacity of Winter Range	Length of Use	Animal Months (2 Elk = 1 cow)
Sub-unit #1	200 elk	5 mo.	500
Sub-unit #2	150 elk	5 mo.	375
Sub-unit #3	1,600 elk	3 mo.	2,400
Total	1,950 elk		3,275



W MANAGEMENT
 BIG GAME
 (ANNUAL REPORT)

LEGEND
 BIG GAME MANAGEMENT AREAS
 UNIT BOUNDARY
 SUB-UNIT BOUNDARY

M-1217-R1 (Revised September 1945)

(See instructions on back of form and
FSM, NF-D8-1, Supp.)

W
MANAGEMENT
Reports
Annual

ANNUAL BIG GAME REPORT, 19__

1. _____ National Forest
2. _____ Ranger District
3. _____ Management Unit
4. _____ Number of Subunit

5. Species	Elk	W.T. deer	Mule deer	Moose	Mt. sheep	Mt. goat	Ante- lope	Bear Black Grizzly
6. Est. no. animals on unit. Winter range only								
7. Estimated capacity of winter range								
8. Difference + or - between (6) and (7)								
9. Estimated capacity of winter range in A.M. Dates:								
10. Losses:								
Legal kill								
Predators								
Other								
Total								

11. Land use conditions: _____

12. Reporting officer

Signature _____ Title _____
Signature _____ Title _____

Instructions for Completing Form

1. Name of the national forest in which the subunit being reported on is located. State game wardens leave blank on units not involving national forests.
2. Name of ranger district. State leave blank if no ranger district is involved.
3. Name of management unit as per 1944 photostat map.
4. Number of subunit as per 1944 photostat map.
5. Report on elk, white-tail deer, mule deer, mountain goat, mountain sheep, moose and antelope.
6. Estimated number of animals that use the winter range only on this subunit. Winter range to be defined locally.
7. Estimated capacity of winter range only in numbers of animals.
8. Show as minus if capacity is greater than present use, plus if capacity is less than present use. (Example: actual present number of animals is 1,000. Estimated capacity is 300. The difference is 200+. Indicates 200 too many on the unit.)
9. Report in cow months, use following converting factors:

1 animal month equals	1 cow for 1 month.
1 " " "	2 elk for 1 month.
1 " " "	4 deer for 1 month.
1 " " "	1 moose for 1 month.
1 " " "	5 antelope for 1 month.
1 " " "	5 mountain sheep or goats for 1 month.
- Show dates, or period, considered on winter range.
10. Self-explanatory.
11. Briefly state condition of range, if overused or under used, conflicts with domestic stock, or anything else relating to big game management that is pertinent to this unit.
12. If compiled jointly by a ranger and a State game warden, both sign and make but one report. Duplicates to be sent to State Officials by game wardens if desired.

Note: Use a separate sheet for each subunit. Originals for each subunit to go to the regional office where summaries will be prepared. Forests and State may summarize for their own benefit if desired, but subunit sheets must still go to the regional office. Forms for summarizing will be supplied on request.

CUMULATIVE RECORD OF BIG GAME DATA

ELK

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. † Or =	Animal No. Winter Range
Absaroka	2,625	1,950	†675	3,275
Beartooth	455	700	-245	1,250
Big Belt-Boulder	1,365	3,200	-1835	6,400
Big Hole-Monida	125	300	-185	1,275
Bitterroot	1,535	2,650	-1115	5,375
Blaine	30	100	-70	200
Bridger-Crazy Mts.	62	150	-88	350
Carter	25	100	-75	600
Cascade				
Choteau	300	300	0	600
Clarks Fork	2,240	3,325	-1085	6,293
Custer				
Deerlodge	1,702	2,460	-658	5,515
Ennis-Hebgen	255	300	-45	525
Fergus	130	600	-470	3,250
Flathead-Sun River	6,100	6,300	-200	12,600
Gallatin	2,502	1,900	†602	6,250
Glasgow	0	100	-100	600
Glendive				
Kalispell	440	510	-110	1,132
Kootenai	541	790	-249	2,790
Little Belts	1,170	3,585	-2415	7,170
Madison-Ruby	1,415	2,500	-1085	7,000
Missouri Breaks	0	800	-800	4,800
Musselshell				
Phillips	0	250	-250	1,500
Polson (Flathead Ind. Res.)	600	1,500	-900	3,000
Poplar				
Powder River				
Swan-Blackfoot	2,640	3,690	-1050	7,305
Sweetgrass Hills	15	50	-35	300
Teton				
Yellowstone				
Glacier Nat'l. Park	3,293			
Blackfeet Ind. Res.	400	100	†300	300
Cheyenne Ind. Res.				
Crow Ind. Res.	1,500			
Ft. Peck Ind. Res.				
Nat'l. Bison Range	78			
Totals	31,543	38,210	-11,488	89,655

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

ELK

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka	3,017	8	203	3,228
Beartooth	37	3	20	60
Big Belt-Boulder	190	71	111	372
Big Hole-Monida	25	16	10	51
Bitterroot	278	45	65	388
Blaine	0	0	10	10
Bridger-Crazy Mts.	0	0	3	3
Carter	0	0	5	5
Cascade				
Choteau	10	0	30	40
Clarks Fork	215	35	125	375
Custer				.
Deerlodge	397	31	90	518
Ennis-Hebgen	50	6	7	63
Fergus	29	6	6	41
Flathead-Sun River	1,396	93	138	1,627
Gallatin	224	25	453	702
Glasgow				
Glendive				
Kalispell	8	0	14	22
Kootenai	0	6	2	8
Little Belts	202	0	25	227
Madison-Ruby	0	32	69	101
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	100	5	0	105
Poplar				
Powder River				
Swan-Blackfoot	404	73	110	587
Sweetgrass Hills	0	4	1	5
Teton				
Yellowstone				
Glacier Nat'l. Park				
Blackfeet Ind. Res.	100	4	0	104
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l Bison Range				
Totals	6,682	463	1,497	8,642

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

WHITE-TAIL DEER

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. ‡ Or -	Animal Mo. Winter Range
Absaroka	25	100	-75	125
Beartooth	120	500	-380	625
Big Belt-Boulder	170	350	-180	1,000
Big Hole-Monida			.	
Bitterroot	445	1,310	-865	1,197
Blaine	100	750	-650	2,250
Bridger-Crazy Mts.	8	1,100	-1092	1,250
Carter	81	600	-519	1,112
Cascade	75	200	-125	500
Choteau				
Clarks Fork	6,895	7,800	-905	7,900
Custer	50	500	-450	1,500
Deerlodge	275	780	-505	752
Ennis-Hegben				
Fergus	700	1,000	-300	3,000
Flathead-Sun River	1,705	2,625	-1020	2,625
Gallatin	0	100	-100	400
Glasgow	550	3,000	-2450	9,000
Glendive	400	400	0	1,200
Kalispell	2,760	4,110	-1350	4,227
Kootenai	14,000	10,130	‡3870	9,755
Little Belts	420	1,150	-730	1,150
Madison-Ruby	0	150	-150	525
Missouri Breaks	350	700	-350	2,100
Musselshell	150	500	-350	1,500
Phillips	175	1,000	-825	3,000
Polson (Flathead Ind. Res.)	1,000	3,000	-2000	3,000
Poplar	1,200	2,500	-1300	7,500
Powder River	15	500	-485	1,500
Swan-Blackfoot	5,100	5,900	-800	5,625
Sweetgrass Hills	25	100	-75	300
Teton	50	150	-100	374
Yellowstone	50	300	-250	900
Glacier Nat'l Park	1,268			
Blackfeet Ind. Res.	200	240	-40	300
Cheyenne Ind. Res.				
Crow Ind. Res.	75			
Ft. Peck Ind. Res.	100	1,000	-900	3,000
Nat'l Bison Range	65			
Totals	38,602	52,545	-15,451	79,192

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

WHITE-TAIL DEER

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka	0	2	2	4
Beartooth	0	5	3	8
Big Belt-Boulder	5	9	7	21
Big Hole-Monida				
Bitterroot	54	42	36	132
Blaine	5	15	15	35
Bridger-Crazy Mts.				
Carter	10	2	7	19
Cascade	1	2	2	5
Choteau				
Clarks Fork	390	675	425	1,490
Custer	2	4	4	10
Deerlodge	15	155	156	326
Ennis-Hebgen				
Fergus	50	28	18	96
Flathead-Sun River	67	125	67	259
Gallatin				
Glasgow	0	30	35	65
Glendive				
Kalispell	157	90	120	367
Kootenai	605	240	285	1,130
Little Belts	65	15	5	85
Madison-Ruby				
Missouri Breaks	30	20	30	80
Musselshell	15	8	2	25
Phillips	1	25	25	51
Polson (Flathead Ind. Res.)	200	20	20	240
Poplar	0	50	50	100
Powder River	0	2	2	4
Swan-Blackfoot	360	670	405	1,435
Sweetgrass Hills	0	5	2	7
Teton	0	3	1	4
Yellowstone	2	5	5	12
Glacier Nat'l. Park				
Blackfeet Ind. Res	25	3	0	28
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.	150	25	25	200
Nat'l Bison Range				
Totals	2,209	2,275	1,754	6,238

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

M U L E D E E R

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. ‡ Or -	Animal Mo. Winter Range
Absaroka	3,450	4,400	-950	5,325
Beartooth	7,000	9,000	-2000	8,750
Big Belt-Boulder	6,795	10,800	-4005	11,044
Big Hole-Monida	1,100	1,500	-400	1,825
Bitterroot	2,725	3,900	-1175	3,837
Blaine	2,100	5,400	-3300	16,200
Bridger-Crazy Mts.	7,200	8,200	-1000	10,250
Carter	590	1,550	-960	3,962
Cascade	800	1,500	-700	3,750
Choteau	900	1,500	-600	1,500
Clarks Fork	12,755	15,050	-2295	16,293
Custer	1,400	2,000	-600	6,000
Deerlodge	5,815	5,700	‡115	5,500
Ennis-Hebgen	3,150	1,700	‡1450	2,387
Fergus	1,500	2,150	-650	6,450
Flathead-Sun River	3,520	4,370	-850	4,370
Gallatin	1,600	2,000	-400	2,562
Glasgow	450	2,500	-2050	7,500
Glendive	200	200	0	600
Kalispell	490	750	-525	1,114
Kootenai	6,250	7,550	-1300	5,175
Little Belts	13,700	19,800	‡-6100	19,800
Madison-Ruby	5,600	7,100	-1600	8,165
Missouri Breaks	1,800	4,000	-2200	12,000
Musselshell	1,300	1,500	-200	4,500
Phillips	1,800	4,000	-2200	12,000
Polson (Flathead Ind. Res.)	700	1,000	-300	1,000
Poplar	100	1,000	-900	3,000
Powder River	1,800	3,600	-1800	10,800
Swan-Blackfoot	4,800	5,550	-550	5,300
Sweetgrass Hills	500	1,000	-500	3,000
Teton	625	900	-275	2,250
Yellowstone	1,200	2,500	-1300	7,500
Glacier Nat'l Park	766			
Blackfeet Ind. Res.	150	200	-50	300
Cheyenne Ind. Res.	200	800	-600	2,400
Crow Ind. Res.	2,500			
Ft. Peck Ind. Res.	20	500	-480	1,500
Nat'l Bison Range	331			
Totals	107,682	145,170	-41,250	217,909

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

M U L E D E E R

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka	420	80	130	630
Beartooth	355	60	110	525
Big Belt-Boulder	1,020	850	460	2,330
Big Hole-Monida	95	55	50	200
Bitterroot	452	280	80	812
Blaine	75	55	65	195
Bridger-Crazy Mts.	650	75	106	831
Carter	55	15	35	105
Cascade	90	20	30	140
Choteau	25	90	50	165
Clarks Fork	877	815	280	1,972
Custer	140	50	50	240
Deerlodge	625	348	616	1,589
Ennis-Hebgen	285	90	20	395
Fergus	280	50	32	362
Flathead-Sun River	819	146	95	1,060
Gallatin	190	80	45	315
Glasgow	23	10	25	58
Glendive				
Kalispell	38	27	30	95
Kootenai	490	220	182	892
Little Belts	1,500	855	120	2,475
Madison-Ruby	625	295	195	1,115
Missouri Breaks	100	50	100	250
Musselshell	200	27	33	260
Phillips	125	100	50	275
Polson (Flathead Ind. Res.)	100	5	0	105
Poplar	0	10	10	20
Powder River	180	155	70	405
Swan-Blackfoot	475	455	240	1,170
Sweetgrass Hills	0	15	25	40
Teton	0	15	45	60
Yellowstone	100	20	20	140
Glacier Nat'l. Park				
Blackfeet Ind. Res.	15	3	0	18
Cheyenne Ind. Res.	50	10	10	70
Crow Ind. Res.				
Ft. Peck Ind. Res.	10	5	5	20
Nat'l. Bison Range				

Totals

10,484

5,436

3,414

19,334

CUMULATIVE RECORD OF BIG GAME DATA

MOOSE

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. + Or -	Animal Mo. Winter Range
Absaroka	475	425	+50	3,825
Beartooth	170	250	-80	1,050
Big Belt-Boulder	60	225	-155	1,455
Big Hole-Monida	180	245	-65	1,225
Bitterroot	285	670	-385	2,810
Blaine				
Bridger-Crazy Mts.	11	55	-44	30
Carter				
Cascade				
Choteau				
Clarks Fork	90	242	-152	932
Custer				
Deerlodge	954	1,160	-206	2,825
Emmis-Hebgen	200	200	0	850
Fergus				
Flathead-Sun River	130	215	-85	860
Gallatin	310	310	0	1,715
Glasgow				
Glendive				
Kalispell	89	144	-55	686
Kootenai	190	250	-60	990
Little Belts	16	130	-114	520
Madison-Ruby	170	400	-230	3,350
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	10	10	0	40
Poplar				
Powder River				
Swan-Blackfoot	14	203	-190	762
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park	300			
Blackfeet Ind. Res.	10	10	0	60
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	3,664	5,144	-1,771	23,985

CUMULATIVE RECORD OF BIG GAME DATA

MOOSE

LOSSES

1947

Management Unit	Legal Kill	Other	Predators	Total
Absaroka	23	0	14	37
Beartooth	0	5	3	8
Big Belt-Boulder	0	2	4	6
Big Hole-Monida	10	0	0	10
Bitterroot	4	4	17	25
Blaine				
Bridger-Crazy Mts.				
Carter				
Cascade				
Choteau				
Clarks Fork	0	0	2	2
Custer				
Deerlodge	25	0	32	57
Ennis-Hebgen	10	0	15	25
Fergus				
Flathead-Sun River	0	0	8	8
Gallatin	9	0	17	26
Glasgow				
Glendive				
Kalispell	9	0	11	20
Kootenai	0	0	18	18
Little Belts	0	0	2	2
Madison-Ruby	0	2	9	11
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	5	0	0	5
Poplar				
Powder River				
Swan-Blackfoot	0	1	2	3
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l Park				
Blackfeet Ind. Res.	4	0	0	4
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	99	14	154	267

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

MOUNTAIN SHEEP

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. & Or. =	Animal Mo. Winter Range
Absaroka	90	250	-160	
Beartooth	160	500	-340	
Big Belt-Boulder	0	250	-250	
Big Hole-Monida	0	50	-50	
Bitterroot	32	350	-318	
Blaine				
Bridger-Crazy Mts.	6	100	-94	
Carter				
Cascade				
Choteau				
Clarks Fork	15	160	-155	
Custer				
Deerlodge	90	330	-240	
Ennis-Hebgen	40	320	-280	
Fergus				
Flathead-Sun River	280	830	-550	
Gallatin	65	315	-250	
Glasgow				
Glendive				
Kalispell				
Kootenai	157	400	-243	
Little Belts				
Madison-Ruby	18	600	-582	
Missouri Breaks	16	1,500	-1484	
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	20	100	-80	
Poplar				
Powder River				
Swan-Blackfoot	20	285	-265	
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park	204			
Blackfeet Ind. Res.	10	40	-30	
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l. Bison Range	12			
Totals	1,235	6,380	-5,371	

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

M O U N T A I N S H E E P

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka	0	7	12	19
Beartooth	0	2	4	6
Big Belt-Boulder				
Big Hole-Monida				
Bitterroot	0	5	2	7
Blaine				
Bridger-Crazy Mts.				
Carter				
Cascade				
Choteau				
Clarks Fork	0	3	7	10
Custer				
Deerlodge	0	4	2	6
Ennis-Hebgen	0	8	0	8
Fergus				
Flathead-Sun River	0	45	30	75
Gallatin	0	8	8	16
Glasgow				
Glendive				
Kalispell				
Kootenai	0	30	4	34
Little Belts				
Madison-Ruby	0	5	0	5
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)				
Poplar				
Powder River				
Swan-Blackfoot	0	3	2	5
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park				
Blackfeet Ind. Res.	5	0	0	5
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l Bison Range				
Total	5	120	71	196

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

MOUNTAIN GOAT

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. & Or. -	Animal Mo. Winter Range
Absaroka				
Beartooth	6	400	-394	
Big Belt-Boulder	0	50	-50	
Big Hole-Monida	30	30	0	
Bitterroot	530	1,350	-820	
Blaine				
Bridger-Crazy Mts.	90	500	-410	
Carter				
Cascade				
Choteau	10	50	-40	
Clarks Fork	285	365	-20	
Custer				
Deerlodge	720	925	-205	
Ennis-Hebgen	0	300	-300	
Fergus				
Flathead-Sun River	1,465	2,065	-600	
Gallatin	5	265	-260	
Glasgow				
Glendive				
Kalispell	130	130	0	
Kootenai	195	275	-80	
Little Belts				
Madison Ruby	0	400	-400	
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	100	500	-400	
Poplar				
Powder River				
Swan-Blackfoot	350	600	-250	
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park	866			
Blackfeet Ind. Res.	20	20	0	
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	4,802	8,225	-4,229	

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

MOUNTAIN GOAT

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka				
Beartooth	0	0	2	2
Big Belt-Boulder				
Big Hole-Monida				
Bitterroot	80	62	29	171
Blaine				
Bridger-Crazy Mts.				
Carter				
Cascade				
Choteau				
Clarks Fork	2	10	0	12
Custer				
Deerlodge	0	15	13	28
Ennis-Hebgen				
Fergus				
Flathead-Sun River	34	50	28	112
Gallatin				
Glasgow				
Glendive				
Kalispell				
Kootenai				
Little Belts				
Madison-Ruby				
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	10	0	0	10
Poplar				
Powder River				
Swan-Blackfoot	0	20	16	36
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park				
Blackfeet Ind. Res.	2	0	0	2
Cheyenne Ind. Res.				
Crow Ind. Res.				
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	128	157	88	373

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

ANTELOPE

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. & Or =	Animal Mo. Winter Range
Absaroka	134	360	-226	168
Beartooth	10	300	-290	60
Big Belt-Boulder	510	2,690	-2180	3,016
Big Hole-Monida	160	600	-440	600
Bitterroot	13	50	-37	30
Blaine	450	3,500	-3050	8,400
Bridger-Crazy Mts.	250	600	-350	1,440
Carter	7,550	7,600	-50	7,610
Cascade	355	1,500	-1145	2,500
Choteau	600	600	0	480
Clarks Fork				
Custer	700	1,000	-300	2,400
Deerlodge	157	660	-503	724
Ennis-Hebgen				
Fergus	350	2,500	-2150	6,000
Flathead-Sun River				
Gallatin				
Glasgow	950	3,800	-2850	9,120
Glendive	450	450	0	1,080
Kalispell				
Kootenai				
Little Belts	520	900	-380	720
Madison-Ruby	1,030	1,100	-70	2,480
Missouri Breaks	600	2,000	-1400	4,800
Musselshell	3,000	3,000	0	7,200
Phillips	225	10,000	-7775	24,000
Polson (Flathead Ind. Res.)	0	100	-100	80
Poplar	15	500	-485	1,200
Powder River	1,310	2,900	-1590	6,960
Swan-Blackfoot				
Sweetgrass Hills	1,500	2,000	-500	4,800
Teton	530	1,500	-970	3,000
Yellowstone	4,500	5,000	-500	12,000
Glacier Nat'l. Park				
Blackfeet Ind. Res.	60	60	0	72
Cheyenne Ind. Res.	25	300	-275	720
Crow Ind. Res.				
Ft. Peck Ind. Res.	75	1,000	-925	2,400
Nat'l. Bison Range				
Totals	26,029	56,570	-28,541	114,060

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

ANTELOPE

LOSSES

1947

Management Unit	Legal Kill	Predators	Other	Total
Absaroka	0	11	10	21
Beartooth	0	0	1	1
Big Belt-Boulder	0	44	115	159
Big Hole-Monida	0	4	2	6
Bitterroot	4	0	0	4
Blaine	250	50	30	330
Bridger-Crazy Mts.	0	19	14	33
Carter	1,205	250	1,250	2,705
Cascade	0	9	6	15
Choteau				
Clarks Fork				
Custer	150	50	25	225
Deerlodge	0	9	12	21
Ennis-Hebgen				
Fergus	0	30	25	55
Flathead-Sun River				
Gallatin				
Glasgow	125	75	55	255
Glendive				
Kalispell				
Kootenai				
Little Belts	35	12	10	57
Madison-Ruby	90	46	38	174
Missouri Breaks	50	25	50	125
Musselshell	300	50	25	375
Phillips	30	25	10	65
Polson (Flathead Ind. Res.)				
Poplar	0	5	2	7
Powder River	115	40	72	227
Swan-Blackfoot				
Sweetgrass Hills	50	20	30	100
Teton	0	20	30	50
Yellowstone	300	50	50	400
Glacier Nat'l. Park				
Blackfeet Ind. Res.	5	4	0	9
Cheyenne Ind. Res.	10	5	5	20
Crow Ind. Res.				
Ft. Peck Ind. Res.	100	25	25	150
Nat'l. Bison Range				
Totals	2,819	878	1,892	5,589

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

GRIZZLY BEAR

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. & Or -	Animal Mo. Winter Range
Absaroka	25			
Beartooth	12			
Big Belt-Boulder				
Big Hole-Monida				
Bitterroot	6			
Blaine				
Bridger-Crazy Mts.				
Carter				
Cascade				
Choteau				
Clarks Fork	28			
Custer				
Deerlodge	2			
Ennis-Hebgen	15			
Fergus				
Flathead-Sun River	205			
Gallatin	10			
Glasgow				
Glendive				
Kalispell	60			
Kootenai	76			
Little Belts				
Madison-Ruby				
Missouri Breaks				
Musselshell				
Phillips				
Polson (Flathead Ind. Res.)	30			
Poplar				
Powder River				
Swan-Blackfoot	71			
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park	105			
Blackfeet Ind. Res.	40			
Cheyenne Ind. Res.				
Crow Ind. Res.	7			
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	692			

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

GRIZZLY BEAR

LOSSES

1947

Management Unit	Legal Kill	Other	Total
Absaroka	5	2	7
Beartooth			
Big Belt-Boulder			
Big Hole-Monida			
Bitterroot			
Blaine			
Bridger-Crazy Mts.			
Carter			
Cascade			
Choteau			
Clarks Fork	1	1	2
Custer			
Deerlodge			
Ennis-Hebgen	5	0	5
Fergus			
Flathead-Sun River	41	10	51
Gallatin			
Glasgow			
Glendive			
Kalispell	1	2	3
Kootenai			
Little Belts			
Madison-Ruby			
Missouri Breaks			
Musselshell			
Phillips			
Polson (Flathead Ind. Res.)	5	0	5
Poplar			
Powder River			
Swan-Blackfoot	1	5	6
Sweetgrass Hills			
Teton			
Yellowstone			
Glacier Nat'l. Park			
Blackfeet Ind. Res.	8	0	8
Cheyenne Ind. Res.			
Crow Ind. Res.			
Ft. Peck Ind. Res.			
Nat'l. Bison Range			
Totals	67	20	87

C U M U L A T I V E R E C O R D O F B I G G A M E D A T A

BLACK BEAR

ESTIMATED POPULATION AND RANGE CAPACITIES

1947

Management Unit	Est. Pop.	Est. Cap. Winter Range	Dif. † Or -	Animal Mo. Winter Range
Absaroka	175			
Beartooth	340			
Big Belt-Boulder	192			
Big Hole-Monida	110			
Bitterroot	482			
Blaine				
Bridger-Crazy Mts.	100			
Carter				
Cascade	8			
Choteau	20			
Clarks Fork	1300			
Custer				
Deerlodge	381			
Ennis-Hebgen	200			
Fergus				
Flathead-Sun River	775			
Gallatin	90			
Glasgow				
Glendive				
Kalispell	365			
Kootenai	1310			
Little Belts	235			
Madison-Ruby	285			
Missouri Breaks				
Musselshell	5			
Phillips				
Polson (Flathead Ind. Res.)	300			
Poplar				
Powder River				
Swan-Blackfoot	720			
Sweetgrass Hills				
Teton				
Yellowstone				
Glacier Nat'l. Park	385			
Blackfeet Ind. Res.	100			
Cheyenne Ind. Res.				
Crow Indian Res.	125			
Ft. Peck Ind. Res.				
Nat'l. Bison Range				
Totals	8,003			

CUMULATIVE RECORD OF BIG GAME DATA

BLACK BEAR

LOSSES

1947

Management Unit	Legal Kill	Other	Total
Absaroka	28	25	53
Beartooth	25	5	30
Big Belt-Boulder	14	14	28
Big Hole-Monida	2	5	7
Bitterroot	92	39	131
Blaine			
Bridger-Crazy Mts.			
Carter			
Cascade			
Choteau			
Clarks Fork	155	60	215
Custer			
Deerlodge	36	39	75
Ennis-Hebgen	25	15	40
Fergus			
Flathead-Sun River	70	4	74
Gallatin	5	0	5
Glasgow			
Glendive			
Kalispell	48	7	55
Kootenai	95	0	95
Little Belts	17	12	29
Madison-Ruby	12	45	57
Missouri Breaks			
Musselshell			
Phillips			
Polson (Flathead Ind. Res.)	125	0	125
Poplar			
Powder River			
Swan-Blackfoot	45	55	100
Sweetgrass Hills			
Teton			
Yellowstone			
Glacier Nat'l. Park			
Blackfeet Ind. Res.	17	0	17
Cheyenne Ind. Res.			
Crow Ind. Res.			
Ft. Peck Ind. Res.			
Nat'l. Bison Range			
Totals	811	325	1,136

STATE Montana

PROJECT 6-D

DATE July 15, 1948

STATE-WIDE

FINAL REPORT

POSTING GAME PRESERVES

The following is a final report covering the period through the fiscal years 1944-45-46 and 47.

During this time it has become increasingly evident that the proper posting of closed areas, sanctuaries and game preserves plays a vital role in the management of Montana's wildlife resources. An important development has been the steady swing away from the old type of hard and fast game preserves to the more flexible administrative closures. This has made clear, well defined boundary markings essential.

A critical analysis of closures of all types has been made during the period under the regular L-R survey program. Recommendations led to the actual abandonment of several game preserves and the creation of a number of administrative closures. It is felt that the beneficial results that are becoming evident would have been seriously nullified had it not been for a system of posting made possible through this project.

Metal signs were used during the early part of the program. As the supply became exhausted, field work on the project was temporarily

delayed. Plywood signs were obtained, however, that have been found very satisfactory. It has now become possible once more to obtain metal signs.

The work has been somewhat seasonal. It was found most economical and practical to fit the posting in during the occasional slack periods between other major projects, thus aiding materially in holding key personnel. Travel about the periphery of the various closures has been accomplished by the use of pick-up, saddle horse and foot travel. Back-country posting has necessitated the establishment of tent camps where necessary. It has been found that there are, at present, over 100 closures of various kinds in the state. The following list contains the more important and more typical of the closures posted under this project.

Skalkaho Preserve - This preserve, located in Ravalli County a few miles east of Hamilton, was changed in scope to exclude portions of winter range and extended to the north in an effort to obtain better distribution of elk. This change in boundary and the re-distribution of game that followed has made it possible to utilize winter range not previously covered by game.

Cherry Creek Preserve - Located in Sanders and Mineral Counties, this preserve was reduced in size to more closely comply with the needs of game management and also to render it more conveniently outlined by posting.

Keystone Administrative Closure - Located in Mineral County, this closure was established to replace the Little St. Joe Game Preserve.

This latter game preserve was showing marked evidence of over-utilization by both elk and deer. The Keystone Preserve was created and the Little St. Joe Preserve abandoned in order to obtain a far more desirable distribution of both species of big game.

Grass Valley Game Preserve - Located in Missoula County, five miles west of Missoula. Primary use, the protection and development of upland game birds. It was found to be still serving a useful purpose and re-posting was necessary to clearly outline the boundaries.

Piniele Game Preserve - Located in Carter County, used primarily for the protection and development of antelope. This preserve was originally rather poorly posted. Its boundaries had become almost impossible to follow. Opening the County to the hunting of antelope made re-posting essential.

Cabin Creek Administrative Closure - This closure is located in Fallon County and was created for the purpose of protecting a plant of mule deer.

Ballantine Game Preserve - This game preserve was established in 1924 in Billings area, Yellowstone County. Its chief value has been the protection and propagation of game birds, however, a considerable amount of benefit has accrued to mule deer as well.

Billings Game Preserve - This preserve was established for the protection and propagation of game animals, antelope, mule deer and game birds. The approximate size is 16,000 acres.

Arrow Creek Bird Closure - This closure was established in 1945

for the protection and propagation of game birds, principally ring-necked pheasants. It is located east of Billings in Yellowstone County. One of the chief purposes for establishing this closure was to create a sanctuary in which to release live trapped pheasants for the purpose of building back the depleted game bird population in that valley. Size, approximately 1,920 acres.

Golden Creek Big Game Closure - This closure was established in 1944 for the purpose of protecting and encouraging the development of a group of deer transplanted into the Bull Mountains from farther west in the state. The closure is located in the Bull Mountain Range south and west of Roundup in Musselshell County. It contains approximately 48,640 acres.

Hawk Fish Creek Closure - This closure is located in the Bull Mountain Range south and east of Roundup in Musselshell County. It was established in 1944 for the same purpose as that described under the Golden Creek Closure. The size is approximately 34,560 acres.

Laurel Bird Closure - This closure was established in 1945 for the protection and propagation of game birds consisting of ring-necked pheasants, Hungarian partridge, sage grouse and sharp-tail grouse. One of its chief functions is to serve as a sanctuary in which to liberate live-trapped pheasants in this portion of the Yellowstone Valley. Contains approximately 7,040 acres.

Pine Ridge Big Game Closure - This closure was established in 1942

for the protection and propagation of mule deer. It is located east of Billings in Yellowstone and Big Horn Counties and contains approximately 126,000 acres.

Polytechnic Bird Closure - This bird closure is located on the western outskirts of Billings in Yellowstone County. It was established primarily to protect private property from pheasant hunters. It has, however, aided materially in the development of substantial game bird population in this area. Its size is approximately 2,600 acres.

Shephard Bird Closure - This closure was established in 1945 in the Shephard Agricultural Development District in Yellowstone County east of Billings. The primary purpose in establishing this sanctuary was to develop an area in which to release live-trapped pheasants in this section of the Valley. It contains approximately 7,720 acres.

Gallatin Game Preserve - This is one of the oldest of the present game preserves, having been established in 1911 for the purpose of protecting and developing the Gallatin elk herd. It is located adjacent to Yellowstone Park on the headwaters of the West Gallatin River in Gallatin County. It is interesting to note that, following intensive big game surveys in the area under the 1-R investigative program for 1941-42, a change was recommended in the boundary of this preserve. This change greatly improved the management of the elk in that area. The size of the preserve is approximately 38,000 acres.

Helena Lake Game Preserve - This preserve was established in

1945 for the protection and development of waterfowl in the area. It is located just west of the lake north of the city of Helena in Lewis and Clark County. Following a careful survey of the area by the game bird 1-R crew, this closure was recommended. A clearly marked boundary was essential as heavy waterfowl hunting takes place in this general vicinity.

The Judith River Big Game Closure - This big game closure was established in 1945 to take the place of an abandoned game preserve known as the Judith River Game Preserve. Recommendations leading to this change were an out-growth of intensive big game surveys in the area (1-R game studies 1941-42). The closure has been established for the purpose of attaining a more desirable distribution of the Judith River elk and deer herds. Over-used winter range areas were becoming apparent on the old preserve, particularly on the lower portions. The new closure to the north is drawing big game away from the old preserve area. A clearly marked boundary was very essential about the edge of the new closure to avoid confusion. This new Judith River Big Game Closure has been established sufficiently long by this time to find that it is working very beneficially in regard to better game management in the general area. It is located in Judith Basin County south of Stanford, and contains approximately 41,000 acres.

The Snowy Mountain Preserve - This game preserve is located on the crest of the Snowy Mountains south of Lewistown in Fergus County. It was established a number of years ago for the protection and development of big game, principally mule and white-tail deer, as well

as game birds, principally native upland grouse. The original markings had become almost entirely obliterated. It contains approximately 25,000 acres.

Limestone Hills Big Game Closure - This closure in Broadwater County south and west of Townsend, was established recently for the purpose of developing the mule deer herd in this key winter area. It had been observed for many years that increasing numbers of hunters were flooding into the region due to extreme accessibility plus a relatively high concentration of deer, particularly during the latter part of the hunting season. It was felt that this heavy pressure was having a decidedly detrimental effect upon the deer. A temporary closure to be continued for several years under close supervision will unquestionably benefit game in the area.

Gates of the Mountains Big Game Closure - This area was closed to the hunting of big game for the development and protection of mountain sheep, mule deer and possibly elk.

Seeley Lake Game Preserve - This game preserve has been in effect for a number of years and was established primarily for the protection of white-tail deer. An investigation of this area by the L-R big game crew indicated that the game preserve was still beneficial in its effect on game.

Arrow Creek Big Game Closure - This closure in the northern portion of Judith Basin County was recently established for the protection of mule deer in this area. It appears that an increased number of this

species would be desirable. A careful investigation of this area was carried out by the Eastern Montana l-R big game crew.

Sarpy Creek Big Game Closure - This closure is located in the northeastern portion of Big Horn County and was established primarily for the purpose of protecting a planted herd of mule deer in the Sarpy Hills.

Grave Creek Big Game Closure - The Grave Creek Big Game Closure was established to substitute for the original game preserve. The newly established big game closure takes in only a fraction of the area originally covered by the game preserve. Careful observations following the establishment of this closure indicate that from a game management standpoint, it is quite satisfactory. Proper posting has been an important phase of the work.

Richland County Big Game Closure - This administrative closure was created primarily to protect mule deer and antelope planted in a desirable section of this county. As this particular county is closed to the hunting of big game during the coming season, this particular closure will not be necessary. However, it has apparently benefited game in the past.

Glendive Area - This closure in Dawson County was created primarily for the protection of an important plant of mule deer within the Glendive badlands area. As it is not expected to open this county during the coming fall to big game hunting, this closure will have no value until the county is again open to hunting. However, it has been

very worthwhile during past seasons. The mule deer in this large badlands type range appear to be developing well from the plants made.

Fairfield Bench Game Bird Closures - There were originally ten small closures scattered strategically over the Fairfield Bench Restoration Area. One of these closures has since been discontinued, however, the remaining nine are apparently working out very well in the development of ring-necked pheasants in this very desirable area. The closures average 80 acres in size.

Stillwater Closure - This closure located in Stillwater County on the west side of the Stillwater River just below the canyon, was established primarily to benefit the group of mountain sheep which range in that territory. It was of particular value during the past years when the chrome development in that area brought a heavy population of miners with a resultant decided increase in hunting pressure.

East Rosebud Big Game Closure - This closure was established primarily to protect an important plant of white-tail deer. It has apparently worked out very beneficially in regard to this species of big game.

Highwoods Game Preserve - The Highwoods Game Preserve in Cascade County was established a number of years ago for the protection of a small herd of planted elk. Since that time the herd has increased considerably, resulting in heavy use of particularly desirable bits of winter range. It is felt at the present time that steps should be taken toward the abandonment of this game preserve, substituting in its

place, if necessary, one or more flexible game closures.

Powder River Big Game Closure - This large closure is being questioned rather seriously at the present time in regard to its actual value to the restoration and development of either deer or antelope. It is expected that an intensive investigation of this particular region will be made during the coming summer.

SUMMARY - This project in aiding the proper posting of game preserves, closed areas, refuges, etc., has not been spectacular, but has been extremely worthwhile. It is hoped that this project or one similar to it, perhaps on a smaller scale, may be continued for several years until all of the closures are properly posted.

Submitted by:
Robert F. Cooney, Director
Wildlife Restoration Division

May 26, 1948

STATE Montana

PROJECT 17-D-3

DATE July 15, 1948

STATE-WIDE

FINAL REPORT

GAME RANGE DEVELOPMENT THROUGH SALT DISTRIBUTION

PERSONNEL:

A. A. O'Claire, State Fish and Game Warden

Walter J. Everin, Chief Deputy, Fish and Game Department

Robert F. Cooney, Director, Wildlife Restoration Division

W. K. Thompson, Assistant Director, Wildlife Restoration Division

Faye M. Couey, Big Game Leader, Wildlife Restoration Division

Merle J. Rognrud, Assistant Big Game Leader, Wildlife Restoration

Division

M. J. Watt, Deputy Game Warden, Hamilton

George Hollibaugh, Deputy Game Warden, Drummond

Cooperating Sportsmen

COOPERATING AGENCIES:

U. S. Forest Service

Johnson Flying Service

Ravalli County Sportsmen's Club

Park County Rod and Gun Club

OBJECTIVES:

The placement of salt on big game ranges has been used as a management tool to guide movements of members of the deer family. By a carefully developed salting program it has been found that deer and elk can be enticed away from critical winter ranges during early spring and held in higher country during the fall. Vital winter vegetation is saved by this shift of game populations, range conditions improved and a supply of forage is reserved for critical winter periods.

ORGANIZATION OF PROJECT:

During the initial stages of the work game range salting was conducted for five years as a research project. After the needs were determined salting was carried as range development and in the future will be considered a maintenance project.

METHODS:

Maps have been prepared of all winter game ranges and salting plans devised to meet the specific needs of each area. These plans have been prepared from management data obtained during big game investigative studies.

Salt used is in 50 pound white blocks. Two to four of these are placed on a salt ground. Two methods of salt distribution are used. One, by the pack strings of the U. S. Forest Service and Deputy Game Warden personnel, salt blocks are placed on many of the game summer ranges. Approximately 78,400 pounds of block salt are put out by pack.

In remote, almost inaccessible regions it has been found desirable

to distribute salt aerially. This has been accomplished each year by use of a Ford Trimotor. Chief advantage of this method are speed, economy, and salt can be dropped during early spring when much of the area would not be accessible by pack strings due to the snow depth and trail conditions. Thirty-eight thousand pounds of block salt are distributed by air.

Salt Distribution by Areas:

Beaverhead Area

Wise River.	500 pounds
Dillon Area	200 pounds

Bitterroot Area

Aerial Distribution	12,000 pounds
-------------------------------	---------------

Cabinet Area

Plains.	1,200 pounds
Thompson Falls.	1,000 pounds
Trout Creek.	1,500 pounds
Noxon.	800 pounds
St. Regis	2,000 pounds

Custer

Absarokee.	1,000 pounds
Red Lodge	2,000 pounds

Deer Lodge

Phillipsburg.	1,500 pounds
-----------------------	--------------

Butte.	500 pounds
Boulder.	800 pounds
Whitehall.	3,400 pounds
Deer Lodge	1,000 pounds

Flathead

Big Prairie.	2,000 pounds
Condon.	800 pounds
North Fork	1,000 pounds
Coram.	2,000 pounds
Spotted Bear	3,000 pounds
Swan Lake.	1,000 pounds
Java.	600 pounds
Tally Lake	1,000 pounds
Aerial Distribution.	12,000 pounds

Gallatin

Bozeman.	4,000 pounds
Shields.	1,100 pounds
Yellowstone.	1,000 pounds

Helena

Canyon Ferry	2,000 pounds
Lincoln.	2,000 pounds

Kootenai

Fortine.	1,500 pounds
Troy.	2,000 pounds

Warland.	2,000 pounds
Rexford.	2,000 pounds
Yaak.	1,200 pounds
Libby	600 pounds
Fisher River	1,500 pounds

Lewis and Clark

Aerial Distribution - Teton.	6,000 pounds
Aerial Distribution - Sun River.	8,000 pounds
Judith.	2,000 pounds
Martinsdale.	1,500 pounds

Lolo

Seeley Lake.	6,000 pounds
Missoula.	5,600 pounds
Lolo.	3,000 pounds
Ninemile	2,000 pounds
Superior.	8,000 pounds
Bonita.	1,000 pounds

AERIAL DISTRIBUTION

Bitterroot Area: Salt distribution in the Bitterroot Drainage was accomplished in four hours and 15 minutes. Of this the Ravalli County Sportsmen's Club paid for one hour's flight. As in 1946, it was arranged to use the tri-motor in conjunction with the U. S. Forest Service and thus save deadhead time from Missoula to Hamilton and return.

Six tons of salt was flown from Hamilton as indicated in the

table below. On each flight 3,000 pounds of salt were carried and four blocks were distributed on each drop.

Flight	Area	Pounds of Salt	Flying Time
1	West Fork	3,000	70 min.
2	East Fork	3,000	60 min.
3	Burnt Fork-Skalkaho	3,000	55 min.
4	West Side Bitterroot Range	3,000	70 min.
Total		12,000	4 ¹ 15"

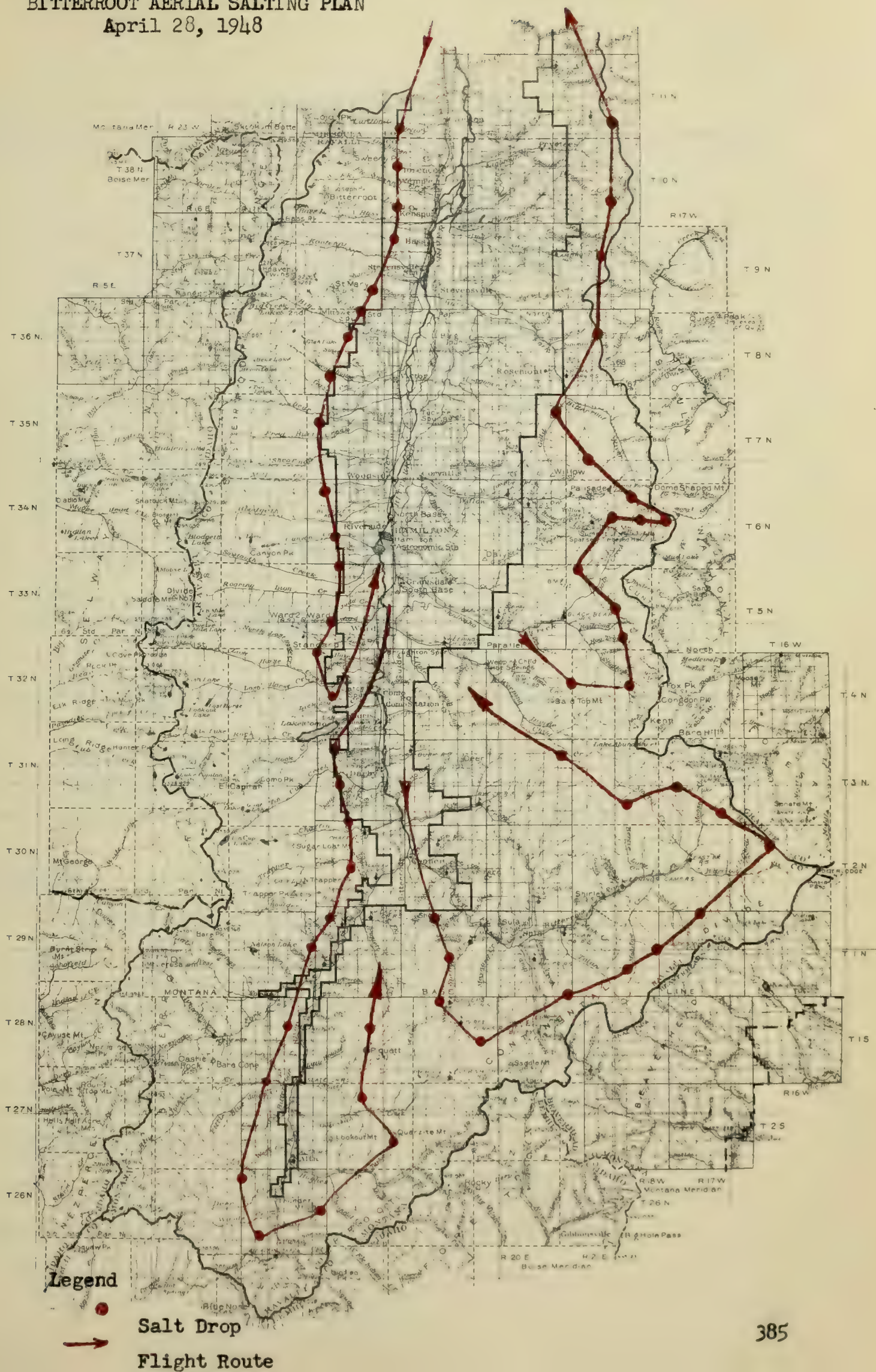
The attached map indicates the salting plan used.

Continental Unit: Aerial salting has been conducted in the Continental Unit since 1942. In this area a salting program is especially desirable because many natural licks are found on winter range. It is desirable to discourage use of natural licks by substituting artificial salt grounds.

The salt drops are located in altitudenal zones. The lower zone with an average elevation of 6,000 feet, represents range that is accessible to elk in the spring, but is well above winter range. The second or alpine zone is located at between 7,000 or 7,500 feet along the Continental Divide or the upper limits of summer range.

BITTERROOT AERIAL SALTING PLAN

April 28, 1948



Flight-Weight-Time Tabulation

Flight	Area	Pounds of Salt	Flight Time
1	Upper South Fork of Flathead - Landing at Augusta	2,800	2:05 hrs.
2	Upper North Fork of Sun River - Landing at Augusta	2,800	1:10 hrs.
3	Sun River-Moose Creek - Bear Creek Area - Landing at Augusta	2,800	1:00 hrs.
4	North Fork Sun River - 6,000 foot Zone - Landing at Augusta	2,800	1:05 hrs.
5	West Fork Sun River and South along Divide - Landing at Missoula	2,800	1:55 hrs.
6	South Fork Flathead-Black Bear to Spotted Bear - Landing at Mis- soula	2,800	1:30 hrs.
7	Swan Mission Range - Landing at Missoula	2,800	1:25 hrs.
8	Schafer Ranger Station - Middle Fork of Flathead - Landing at Missoula	2,800	2:40 hrs.

CONCLUSIONS:

Observations from elk tagging, checking station, summer examination of forage and inspection of salt grounds have shown that the salting program is successful in distributing big game species.

Cost analysis of methods of distribution have indicated that in some areas aerial salting is the most economical as well as the most efficient means of salt placement.

Total salt output has increased from 64,000 pounds in 1940 to 116,400 pounds in 1947.

Aerial Distribution of Salt in Mountains

Game Range Unit	Tons of Salt Placed					
	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47
Sun River	5.5	5.5	5.5	5.5	5.5	5.5
South Fork of Flathead		3.0	3.0	2.8	2.8	2.8
Middle Fork of Flathead		1.4	1.4	1.4	1.4	1.4
Swan-Mission Range				1.3	1.3	1.3
Bitterroot Range					4.0	6.0

RECOMMENDATIONS:

It is recommended that the present distribution of salt be continued with the following suggested changes.

1. Include the North Fork of Flathead in the aerial salting program. One ton of salt to be flown from Kalispell.

2. Revise the Bitterroot salting plan and not attempt to correlate salting with U. S. Forest Service flights. A revision providing for 1 1/2 ton from Missoula to be dropped enroute to Hamilton and three loads out of Hamilton, with the last load being dropped on the return to Missoula, will enable the Game Department to fly in the early morning hours when the air is not rough and to select a suitable day for the job. Little, if any, additional expense will be incurred by this revision and better results are assured, as well as greater safety.

3. A detailed review is being made of the effect of salt placement on the Sun River slope of the Continental Unit. It is felt that some adjustment may be desirable in regard to the altitudinal zone distribu-

tion pattern more in keeping with the vegetative readiness of the important forage plants. In other words it appears that the alpine drops should be delayed for perhaps a month after the intermediate drops (6,000 foot zone) have been made. This should preclude heavy premature grazing in alpine basins.

It is proposed this year to move the alpine drops down into the intermediate zone, thus, it is hoped accomplishing the desired objective and still getting the salt out during the one flight operation.

Submitted by:

W. K. Thompson, Assistant Director
Wildlife Restoration Division

June 15, 1948

STATE Montana

PROJECT 21-R-2

DATE July 15, 1948

STATE-WIDE

MAGPIE CONTROL INVESTIGATION

PERSONNEL:

Wm. R. Bergeson, Game Bird Leader, Wildlife Restoration Division

Robert J. Greene, Fieldman, Wildlife Restoration Division

Don Williams, Field Assistant, Wildlife Restoration Division

Organized Sportsmen's Groups

County Extension Agents

PURPOSE:

1. To determine the range and comparative abundance of the magpie in the State.

2. To establish the degree of depredation by magpies on game birds, particularly the pheasant.

3. To secure information on types of magpie control used and the degree of success.

PROCEDURE:

In order to determine the relative numbers of magpies in the State, the areas of heavy concentration, and the relationship between magpies and game birds, particularly pheasants, questionnaires were mailed to all organized sportsmen's associations and to the County

Extension Agent in each County of the State. In addition, a survey was made over most of the State by Restoration Division personnel in order to gain first hand information on the problem through observation and contacts with farmers, game wardens, and sportsmen.

Returns on the questionnaires were poor. Reports were received from only 38 of the 56 counties. The personal survey covered 39 counties, including the ones not reported on the questionnaire so information was received from the entire State. Coincidental with pheasant field work, observations were made to determine the degree of predation by magpies upon pheasant eggs and young birds.

FINDINGS:

For distribution and relative abundance of magpies in Montana see Map 1. It will be noted that magpies are found in varying numbers over the whole State, being common in all major drainages and tributaries with the exception of drainages in a few counties in northwestern Montana. It was found that the range where the magpie is most abundant corresponds almost exactly with the range of the ring-necked pheasant in Montana.

Of the 38 counties reporting by questionnaire, 23 were carrying out a magpie control program and six were planning a program. Control programs were sponsored by sportsmen's organizations, county agencies, and other organizations. Estimated cost of the programs ranged as high as \$900 a year. Control measures consisted of trapping, poisoning, contests, bounties, organized hunts, nest destruction, etc. One county had hired a man as a full time trapper with good results. The approximate cost of this control was 12¢ per bird trapped. Bounties

ranged from 2¢ to 10¢ per bird for adult birds. Gallatin County reported gathering 10,500 eggs while Lake County reported the highest number of adult birds destroyed, 15,000. Varying degrees of success were reported on the control work in various counties. As high as 80% eradication of the birds was reported for one area in Sheridan County where a very intense program was carried out.

Control measures that had proved successful differed in different areas in the State. Egg collecting and the payment of bounties were reported as being unsuccessful in a number of counties. Poisoning was also unsuccessful due to the fact that many land-owners objected to the use of poison on their property.

Reports from 26 counties indicated that the magpies had increased in numbers over the past five years. One report stated that the magpies had increased 9-10 times over the numbers of a few years ago.

With the range of the magpies and the ring-necked pheasant corresponding so closely, the question arises as to what damage the magpie might inflict on the pheasant population. Twenty-seven of the 38 questionnaires received reported that the magpie is known to be destructive to game birds, and that there was a correlation between the decrease in pheasant population and the increase in magpie population. The most serious damage to the pheasant population by magpies is caused by nest destruction, eating eggs, and killing young. Several reports were received where magpies were actually seen eating pheasant eggs and killing the young birds. However, most reports of predation were based on evidence such as egg shells in the brush where magpies were numerous, rather than actual observations of predation.

Submitted by:

Wm. R. Bergeson, Game Bird Leader
Wildlife Restoration Division

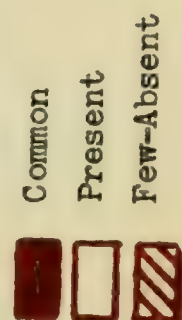
July 1, 1948

MONTANA

Map I. Distribution of Magpies. This map shows the distribution of magpies across Montana, with red lines indicating their range. The map includes county names, major rivers, and cities. The distribution is concentrated in the northern and central parts of the state, following the course of the Yellowstone and Missouri rivers and their tributaries. The range extends from the Canadian border in the north to the southern border, and from the Rocky Mountains in the west to the eastern border. The map is oriented with North at the top.

MAP I. Distribution of Magpies

MAP I. Distribution of Magpies





STATE Montana

PROJECT 21-R-2

DATE July 15, 1948

STATE-WIDE UNIT

MAGPIE TRAPPING IN THE TWIN BRIDGES AND SHERIDAN AREAS

January to March, 1948

The small 2 x 4 x 4 traps were used most extensively and successfully during this trapping season, although some 4 x 6 x 6 traps were used, but were found to be inferior. The funnel entrance on this type of trap was found to be much more satisfactory than the "V" type trap used by most farmers on their larger traps. However, it is believed that the larger the trap the better, since more than one funnel can be used and the trap looks less like a box. These small traps must be checked and rebaited every day or two, since the snow covers the bait and funnel. A special catching net is required, similar to a fish landing net with a long handle to remove the birds from the trap.

The bait supply, of course, was limited, and the best supply of good bait was obtained at the slaughter house at Twin Bridges. The best bait was found to be hog intestines, since magpies like fat and not especially the lungs as commonly believed. The bait was placed above the funnel on each side and at the end of the funnel, leaving just enough room for a bird to get by without squeezing.

These traps were placed in localities where the magpies were observed to feed and were located a few feet from the edge of brushy cover in order that magpies could see them easily. Most successful locations were in grain fields and near sheep pens not too near buildings or a heavily traveled road. The most magpies caught in a single trap was 25, while the most caught in one day was 50 -- all in the same grain field.

Besides trapping, poison stations were established and experiments were made with several poisons to determine the best one. Potassium Cyanide was found to work very well for the first few days after it was set out, but lost its strength after that time. The best formula was found to be 1/2 oz. of strychnine alkaloid to 1 pound of suet, mixed with a little red meat and about 1/2 pint of neatsfoot oil. The neatsfoot oil keeps the suet from becoming brittle in cold weather and also tends to hide the poison's bitter taste, besides having a very strong animal odor. Dead birds were usually found within 10 or 20 feet of the stations where the above formula was used. With poison, the best results were again obtained near sheep pens or in grain fields.

Probably the main reason there are so many magpies in this area is because of the numerous sheep ranches and attendant sheep carcasses lying in their vicinity. Everyone was very glad to see the magpies destroyed, but not so willing to put out time and effort to do the destroying or to dispose of the garbage and carcasses in their barnyards.

A project of this kind in the Sheridan area is not recommended

again for several reasons. First, the weather is too mild and snow is essential for good trapping; second, trapping is far too costly to be used in such a mild climate. Poison would work better if everyone agreed to use it, but few were willing to have it on their ranch. The third, and most important reason, is that the people weren't interested in trapping magpies or protecting pheasants. Almost every farmer contacted who had any grain at all didn't seem to care if all the pheasants were killed off, since they believe pheasants damage grain crops.

Most of the sportsmen want pheasants and want very much to see the magpies destroyed. M. J. Birrer of Sheridan, president of the local club, was and will be, very glad to help in any program of the Department. It is suggested that the sportsmen conduct their own project with some support from the Fish and Game Department.

Submitted by:

Don C. Williams, Field Assistant
Wildlife Restoration Division

May 24, 1948

STATE Montana

PROJECT 22-D

DATE July 15, 1948

MISSOURI BREAKS UNIT

FINAL REPORT

MOUNTAIN SHEEP HOLDING PASTURE

FORT PECK GAME RANGE AREA

SUPERVISORS:

A. A. O'Claire, State Fish and Game Warden

Robert F. Cooney, Director, Wildlife Restoration Division

PERSONNEL:

Faye M. Couey, Big Game Leader, Wildlife Restoration Division

Don L. Brown, Assistant Big Game Leader, Wildlife Restoration
Division

Charles Harkness, Field Foreman, Wildlife Restoration Division

COOPERATING AGENCIES:

Fish and Wildlife Service (Tom Horn, Manager Fort Peck Game
Range and his staff)

Bureau of Land Management

Soil Conservation Service

Local ranchers and sportsmen

ACCOMPLISHMENTS:

The Missouri Breaks within and adjacent to the Fort Peck Game Range present apparently ideal mountain sheep range. During historic times large numbers of the Audubon variety of mountain sheep were found in the area. Indiscriminate hunting plus perhaps other factors, however, caused their total extinction by 1916.

There have been no bighorn sheep in the area since that time. It is isolated by great distance from the present range of the remaining herds. It is impractical, therefore, to expect a natural migration into the area.

The re-introduction of mountain sheep by transplanting presents a very desirable possibility. Former experience in this type of work has indicated that a holding pasture sufficiently large to accommodate the planted sheep for a period of up to two years would be a material aid in assuring the success of the project. Sheep released directly tend to scatter widely away from the point of release . With the limited numbers available for planting purposes, it is extremely desirable that a minimum of scattering take place.

It was, therefore, planned that a holding pasture be constructed which would enclose about a half section of suitable habitat. An eight foot woven wire fence with set posts was used to encompass an area of sufficient forage and water to preclude the necessity of artificial feeding or watering.

An intensive field examination of this area by Fish and Game Department personnel in company with Howard Osmundson, range technician for the Soil Conservation Service, Tom Horn, Refuge Manager Fort Peck

Game Range, and Frank McKeever, local rancher, was the basis for computing the size of this pasture, based on the carrying capacity of this type of forage.

The pasture, as shown by the accompanying map, lies in Section five and eight, Township 21 North, Range 34 East. All of Section five and that portion of Section eight that is not privately owned is Government land under the administration of the Bureau of Land Management. Leases have been obtained for the use of these lands.

Government Land	254 acres
Private land (Frank McKeever)	<u>74</u> acres
Total	328 acres

The fenced area drains eastward into Billy Creek. The eastern boundary encloses roughly 80 acres of extremely rough badlands. The balance of the pasture is rolling grassland with scattered patches of scrubby Ponderosa pine and an occasional Douglas fir. Principal grasses are Bouteloua gracilis, Carex filifolia, Calamouilfa longifolia, Agropyron smithii, Koeleria cristata, Poa sp., Stipa sp., Andropogon sp., and other less palatable species. Browse plants consist largely of Artemisia (3 species), Gutierrezia sp., Symphoricarpos sp., Prunus, Salix, Amelanchier, Sarcobatus and three species of Juniperus. Several weed species are found of which Trogopogon is the most common.

The fence consists of lodgepole posts ten feet long set two feet in the ground and adequately braced. Light woven wire seven feet high was placed on the inside of the posts and two strands of barbed wire placed six inches apart on top of this. There were about three miles of this fence.

The fence was located that at no point would animals be able to jump over except up hill or at least from the level. Where there might be a possibility of getting a running start at a low place, an arm was built projecting inward at a 45 degree angle with two more barbed wire strands attached.

Where the fence crossed coulees, and there were two large ones, special gates were built to swing and let high water and accompanying trash go through and still prevent the sheep from getting out.

The rough terrain and many problems arising therefrom caused more time and a corresponding increase in expense to be added to the original estimated costs of the project. Below is a list of total cost of construction.

Salaries and Wages	\$ 2,988.70
Subsistence	813.75
Operation and Rental of Equipment	521.37
Tel. & Tel., Workmen's Comp., Contingency	95.94
Materials	<u>2,775.22</u>
Total	\$ 7,194.98

Two springs which constituted about the only source of water in the enclosure were dynamited and curbed such that an adequate supply of water was insured. A reservoir built outside the fence and just above these springs, but abandoned because of a leaky bottom, was treated with bentonite so that it would hold run-off water. This should help stabilize the spring flow.

As this area adjoins the Fort Peck Game Range we feel fortunate in having the additional protection this affords. Fish and Wildlife

patrolmen are making particular effort to keep an eye on the sheep and the pasture. Their predator control program has been modified to give particular emphasis on reduction of both coyotes and bobcats in this area. We are also indebted to this Service for considerable time and use of equipment in construction of the fence.

On November 16th, 1947, 16 bighorns were released in this enclosure. This included two large rams, one young ram, nine ewes and four lambs. These animals were supplied by the Colorado Game and Fish Department and they were trapped from the Tarryall herd. We feel fortunate to be able to obtain stock from this exceptionally thrifty herd and hope to keep this group free from any other strains at least until they become well established here.

During the breeding season the small ram escaped from the pasture. Evidence indicated that he was forced through the fence by one of the larger rams. He stayed in the vicinity a short while then disappeared. During latter April an inspection revealed the remaining 15 sheep to be in fine condition and quite at home in the enclosure.

Submitted by:

Faye M. Couey, Big Game Leader
Wildlife Restoration Division

May 4, 1948



Mountain Sheep Tight Fence Used on Pasture



Typical of the rough terrain through which the fence was constructed.



Photo from the air showing fence and north side
of the Mountain Sheep Pasture.



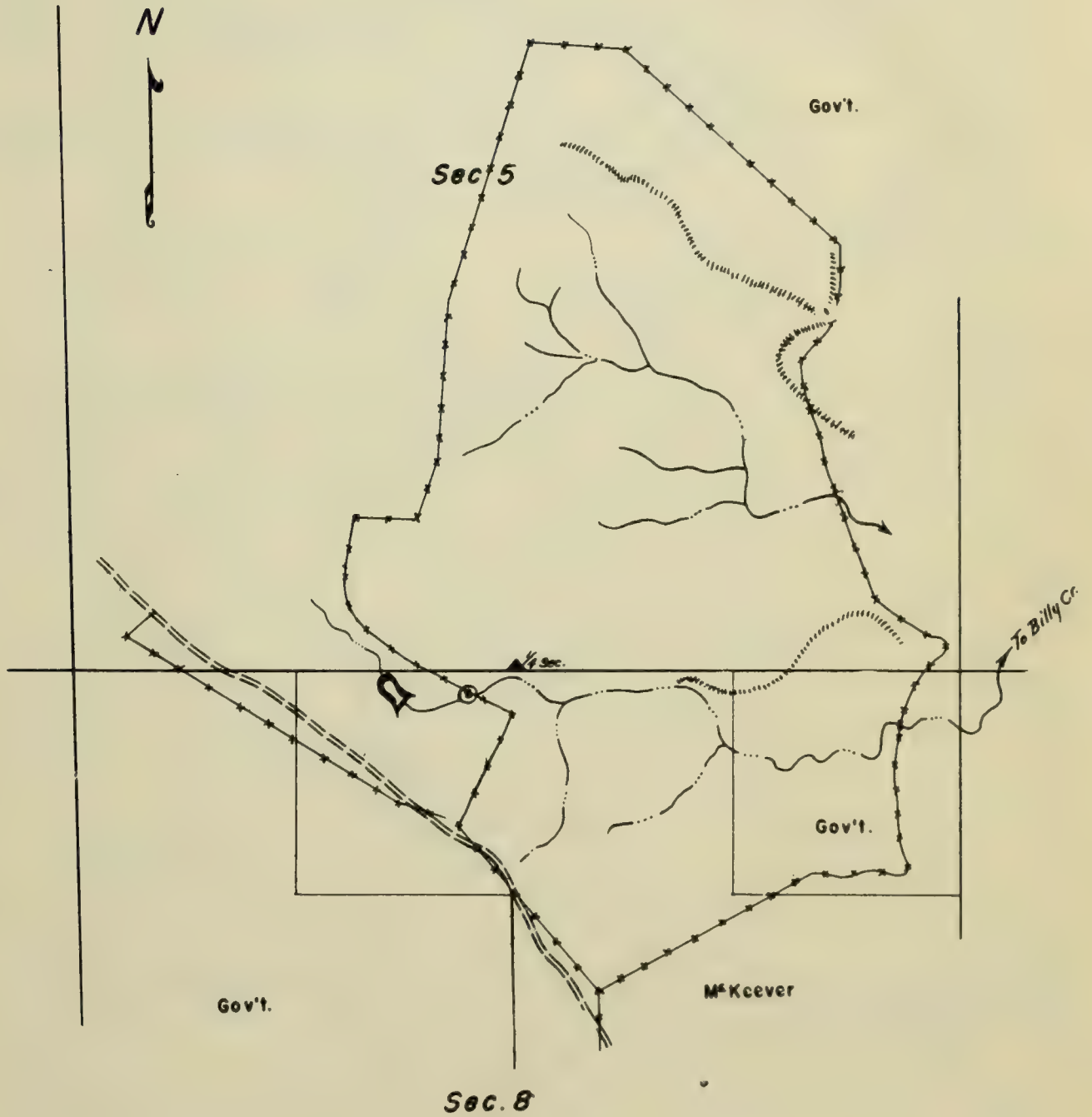
Swinging type trash gate constructed in canyon
bottom across a drywash.

STATE FISH AND GAME DEPARTMENT

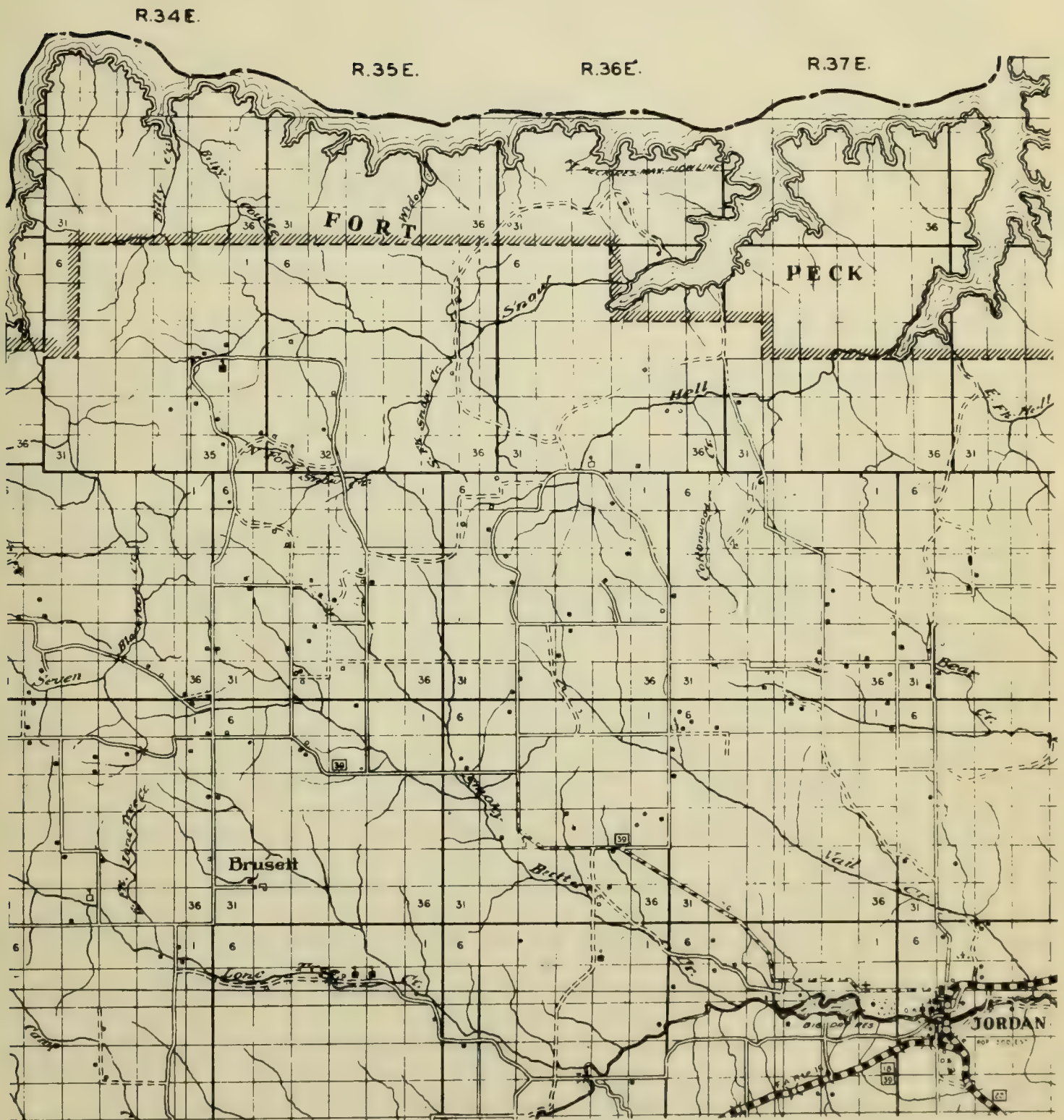
BIGHORN SHEEP TRANSPLANTING
AREA

Billy Creek - Missouri Breaks

T.21 N. R.34 E.



MISSOURI BREAKS MOUNTAIN SHEEP DEVELOPMENT AREA



STATE Montana

PROJECT 24-M

DATE July 15, 1948

WATER FACILITIES

WILDLIFE HABITAT DEVELOPMENT AERIAL INSPECTION

MUSSELSHELL AND PETROLEUM COUNTIES

DATE:

April 27, 1948

PERSONNEL:

Wm. R. Bergeson, Game Bird Leader, Wildlife Restoration Division

Don L. Brown, Ass't. Big Game Leader, Wildlife Restoration
Division

PURPOSE:

For several years it has been thought that inspection of the 8-D Wildlife Habitat Development areas, many of which involve traveling long distances over rough, unimproved roads, could be more satisfactorily inspected from an airplane with reference to species and numbers of waterfowl present, condition of cover, water levels within the reservoir, and condition of the fences surrounding them.

Accordingly, two and a quarter hours flying time were spent checking 10 reservoirs in Musselshell and Petroleum Counties to determine if this method was practical.

PROCEDURE:

Leaving Roundup in the morning the observers inspected each reservoir from an altitude of approximately 1,000 feet, then low enough to distinguish the various species of waterfowl present, and again lower to check the condition of the fences.

No attempt was made to make precise observations since the purpose of the flight was to determine only the feasibility of this type of inspection.

FINDINGS:

Following is a brief resume of what was seen at each reservoir area in order of incidence:

Alt: Water very low, wildlife area exposed to cattle trespass through water side, no waterfowl observed, fence in need of minor repairs.

*Big Meyers: Reservoir very low, fence falling down in several places and down over most of west end, about 25 ducks present most of which were mallards.

"Little Meyers: Water very low, fence down on east side and in need of repairs elsewhere, about 20 ducks present mostly teal - one pair mallards noted.

Yellow Water: Water level below normal for this season, but adequate to carry through the year. Approximately 1,500 waterfowl of different species noted. No attempt was made to distinguish species, but mallards, teal, snowblers, pintails, canvas backs and coots were noted. Fence repairs are needed along the water line.

*These reservoirs have not been recommended for future maintenance by W. K. Thompson in "Water Facilities and Wildlife Habitat Development", Quarterly Report, September, 1947.

War Horse: Water very low, several thousand ducks and shore birds noted, but no attempt was made to identify various species present. Fence in good shape.

Little Bear: Dry.

Unnamed Reservoir: (1 mile N.E. of Little Bear) Has excellent wildlife area, fence in poor shape and down in several places, reservoir 1/2 full, 12 ducks mainly mallards present.

Goodwin: Dry, fence in need of repairs, cover in development area is very good. This reservoir may fill during June.

Melstone: Water level very low, fence in good shape. Several pairs of mallards present, also many coots.

Woods: Water level low, fence intact, pot hole wildlife area below dam filled with water. No waterfowl observed.

Although the observers did not land the plane at any of the reservoirs, the type of terrain is such that landings could very easily be made if necessary and a detailed inspection accomplished at each site.

CONCLUSIONS:

The use of an airplane provides a very economical, time saving, and satisfactory method of inspecting reservoir development areas most of which are widely scattered and rather difficult to reach by other methods of travel. Although ducks sometimes flush when approached at very low altitudes it is possible to distinguish species in most cases. Some difficulty was experienced in identifying diving ducks which in several instances went under water on the approach of the plane, but even here circling a few times would allow satisfactory identification.

RECOMMENDATIONS:

It is recommended that each of these areas be inspected by air during the next 30 days and again during the summer and fall seasons. If this were done systematically each year, their comparative and overall values could be easily determined.

May 8, 1948

Submitted by:

Wm. R. Bergeson, Game Bird Leader
Don L. Brown, Ass't. Big Game Leader
Wildlife Restoration Division

STATE Montana

PROJECT 26-M

DATE July 15, 1948

BITTERROOT UNIT

AERIAL SALT DISTRIBUTION

DATE:

April 28, 1948

PERSONNEL:

Ken Thompson, Assistant Director, Wildlife Restoration Division

Merle Rognrud, Ass't. Big Game Leader, Wildlife Restoration Division

M. J. Watt, Deputy Game Warden

Jerry Verheltz, Pilot, Johnson Flying Service

PURPOSE:

The third annual aerial salting of game ranges in the Bitterroot Unit was made to continue the plan for securing a more desirable seasonal distribution of big game. The salt drops, have attracted elk and deer to higher elevations earlier in the spring thus minimizing the period of use for winter ranges. Salt on the west side is available for goats and some east side drops could be used by moose.

PROCEDURE:

Six tons of salt were dropped from the Johnson Flying Service

un-motored plane in four hours and fifteen minutes of flying time.* The drops each were four 50-pound blocks of salt located along the flight route as indicated on the map showing the salt plan for the Bitterroot Unit.

One flight was loaded out of Missoula and three loads were flown from Hamilton. M. J. Watt spotted the salt drops except on the east fork trip which was guided by Earl Malone of the Ravalli County Sportsmen's Club. Ernest Petersen also assisted in the salting work and Jerry Verheltz piloted the plane.

FINDINGS:

The maximum use of flying time was made by planning the trips as follows; flight one routed along the west side Bitterroot Range from Missoula to Hamilton. Flight two was made over the West Fork, flight three into the East Fork and flight four along the east side of the Burnt Fork-Skalkaho country returning to Missoula. Each trip required approximately one hour of flying time.

Salting in the Bitterroot Unit has developed into a quite satisfactory plan (See map). No changes in the location of drops for 1949 are contemplated at present. However, investigation of the sites should be made as opportunity is afforded to determine their use by game. Most drops were made in open parks on the ridges so the more accessible sites could be checked. In some instances it may be desirable for a change in location of the drop.

RECOMMENDATIONS:

The Bitterroot Unit be salted during the spring of 1949 after the

*One hour of flying time was paid for by the Ravalli County Sportsmen's Club.)

plan shown on the map.

Salt drops be investigated when opportunity is afforded to find the extent of use by game.

Localities of heavy winter use by game and where damage to private property occurs be periodically inspected to determine whether heavier salting or a different pattern of drops would improve the condition.

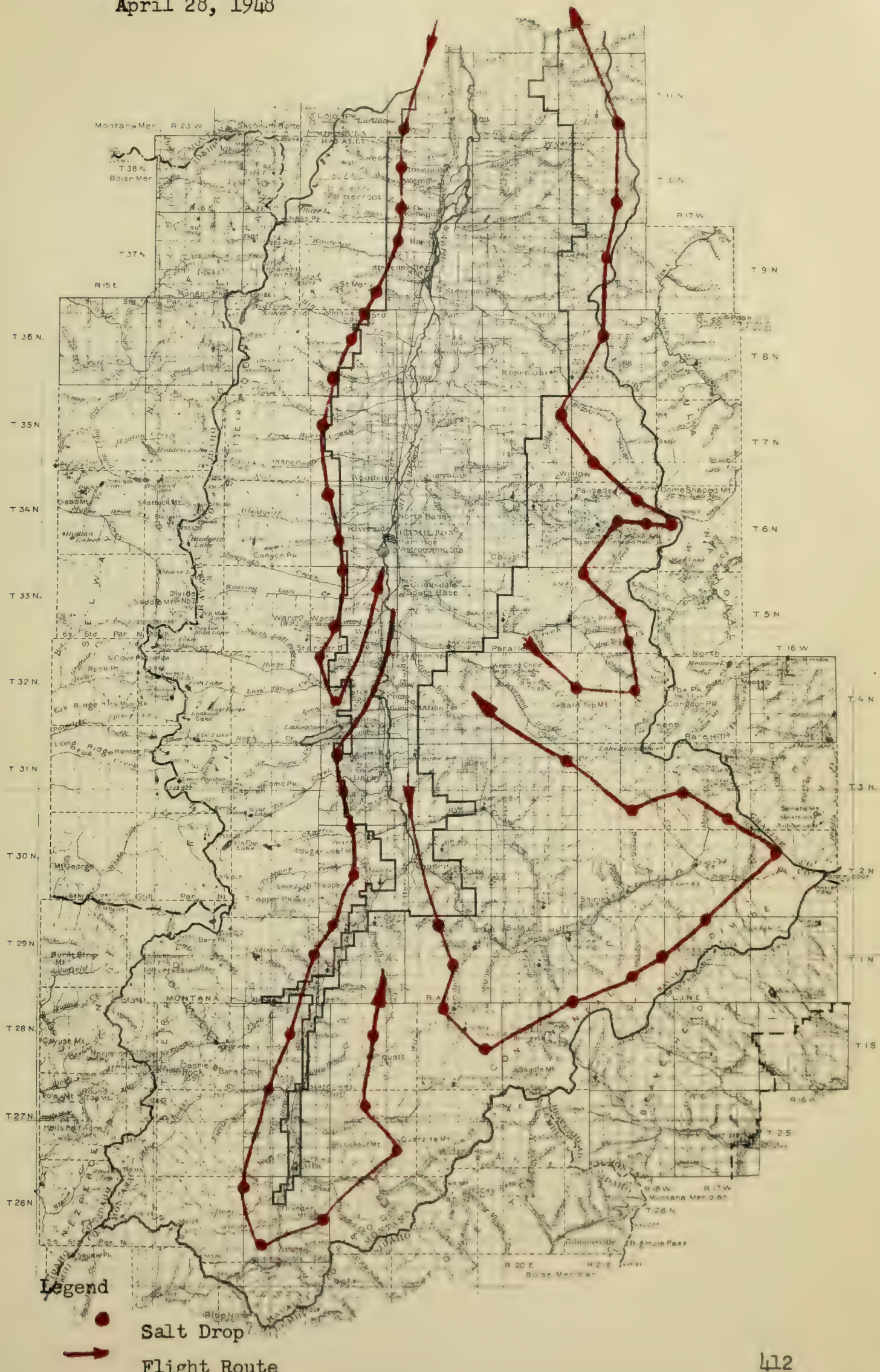
Submitted by:

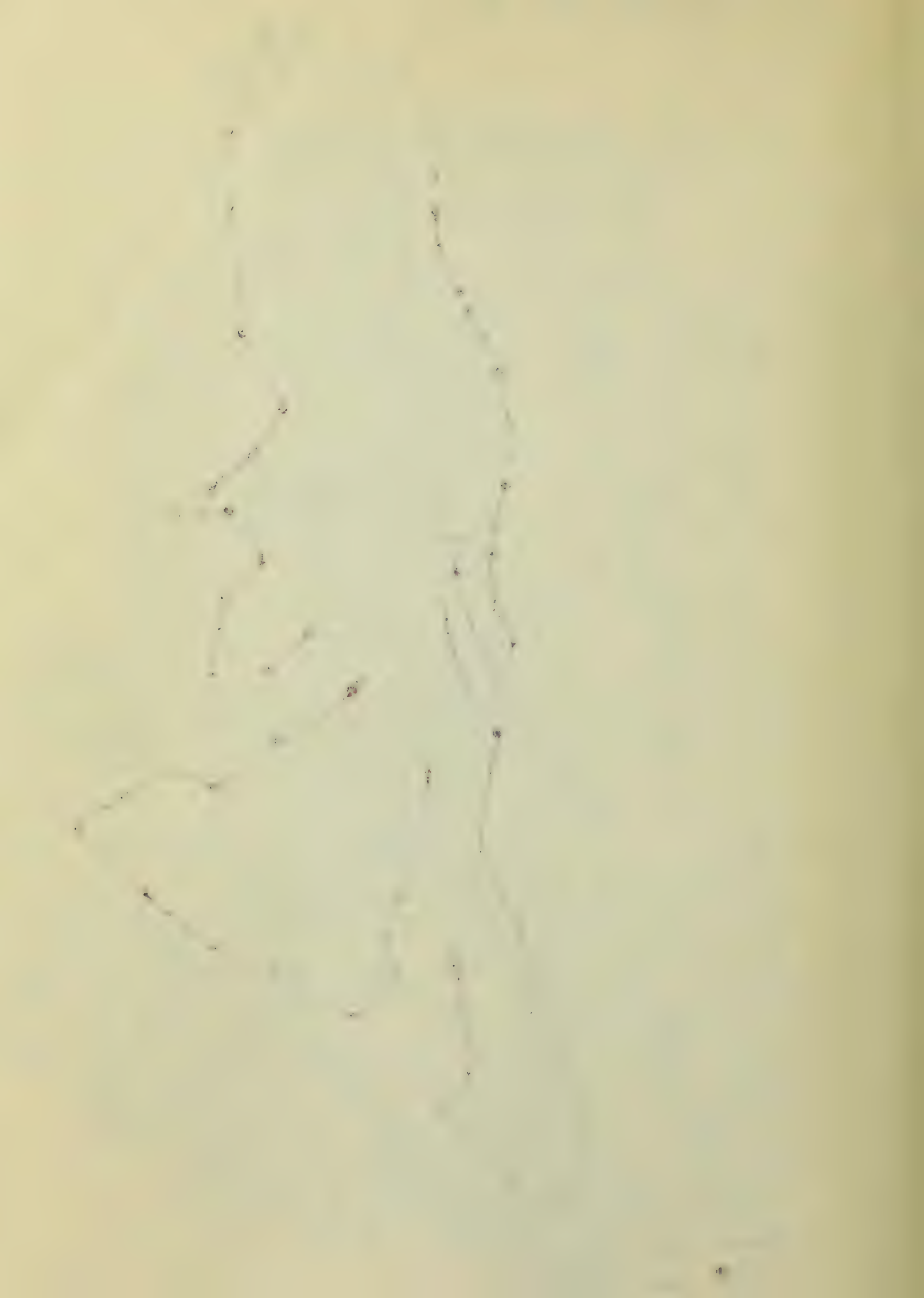
Merle Rognrud, Ass't. Big Game Leader
Wildlife Restoration Division

May 20, 1948

BITTERROOT AERIAL SALTING PLAN

April 28, 1948





Helena, Montana
July 15, 1948

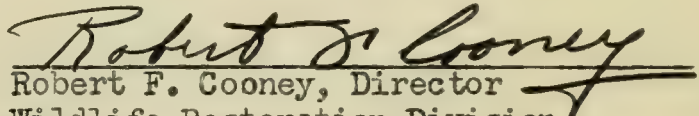
Regional Director
Fish and Wildlife Service
Swan Island
Portland, 18 Oregon

Dear Sir:

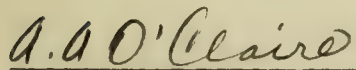
We are herewith submitting a Quarterly Progress Report in connection with the projects carried out through the use of Federal Aid in Wildlife Restoration funds.

The coverage is for the period April, May and June, 1948.

Submitted by:


Robert F. Cooney, Director
Wildlife Restoration Division

Approved by:


A. A. O'Claire
State Fish and Game Warden

[illegible]

639.9

Mo

Acc. #1186

Wildlife restoration division
quarterly report - Apr. - June, 1948

Montana State Fish & Game Commission

DISCARD

